MANUAL

COMPONENT MAINTENANCE MANUAL WITH IPL

PNEUMATIC FLOW CONTROL UNIT

803661-01
803661-03
803661-04

II-184

SCOTT®

35-21-84
T-1
May 30/90

SCOTT AVIATION • A FIGGIE INTERNATIONAL COMPANY
Lancaster, New York 14086

PRINTED IN U.S.A.

RECORD OF REVISIONS

REV NO.	ISSUE DATE	DATE INSERTED	BY	REV NO.	ISSUE DATE	DATE INSERTED	BY
1	May 30/90						

RECORD OF TEMPORARY REVISIONS

TEMPORARY REV. NO.	PAGE NUMBER	ISSUE DATE	BY	DATE REMOVED	BY

SERVICE BULLETIN LIST

NUMBER	REV	DATE INCORP	BY	NUMBER	REV	DATE INCORP	BY

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INTRODUCTION

This manual establishes the proper maintenance procedures which shall be followed by user maintenance, overhaul and service personnel when performing any type of service on the 803661 Pneumatic Flow Control Units described herein.

It is the primary intent of this manual:

a. To specify proper safety regulations to be followed during performance of service on oxygen equipment used in aviation applications.

b. To establish proper sequence of operations to be performed on the defined equipment.

c. To provide the user with the data necessary to properly maintain, check, test and repair the equipment.

The following WARNINGS are presented to inform the user of this manual of the requirements which shall be adhered to when performing service procedures on this equipment. Additional WARNINGS will be found in the procedural steps in the manual.

WARNING: ANY SERVICE OR OVERHAUL PERFORMED ON THIS APPARATUS SHALL BE DONE ONLY BY THOSE FACILITIES EXPERIENCED IN, OR BY PERSONNEL KNOWLEDGEABLE IN AVIATION OXYGEN EQUIPMENT. IF NONE ARE KNOWN, CONTACT SCOTT AVIATION OR ITS DISTRIBUTORS FOR NAMES OF AUTHORIZED SERVICE CENTERS.

WARNING: ALL PROCEDURES DESCRIBED IN THIS MANUAL SHALL BE PERFORMED IN AN AREA FREE OF OIL, GREASE, FLAMMABLE SOLVENTS OR OTHER COMBUSTIBLE MATERIALS. SUCH MATERIALS, AS WELL AS DUST, LINT, AND FINE METAL FILINGS ARE ALL POTENTAL COMBUSTIBLES WHICH MIGHT, WHEN EXPOSED TO OXYGEN UNDER PRESSURE IGNITE AND RESULT IN AN EXPLOSION AND/OR FIRE.

WARNING: DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS, OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. SUCH MATERIALS, AS WELL AS DUST, LINT, AND FINE METAL FILINGS ARE ALL POTENTIAL COMBUSTIBLES WHICH MIGHT, WHEN EXPOSED TO OXYGEN UNDER PRESSURE, IGNITE AND RESULT IN AN EXPLOSION.

Verification

Section	Date
Testing and Fault Isolation	Sep 10/87
Disassembly	Sep 10/87
Assembly	Sep 10/87

DESCRIPTION AND OPERATION

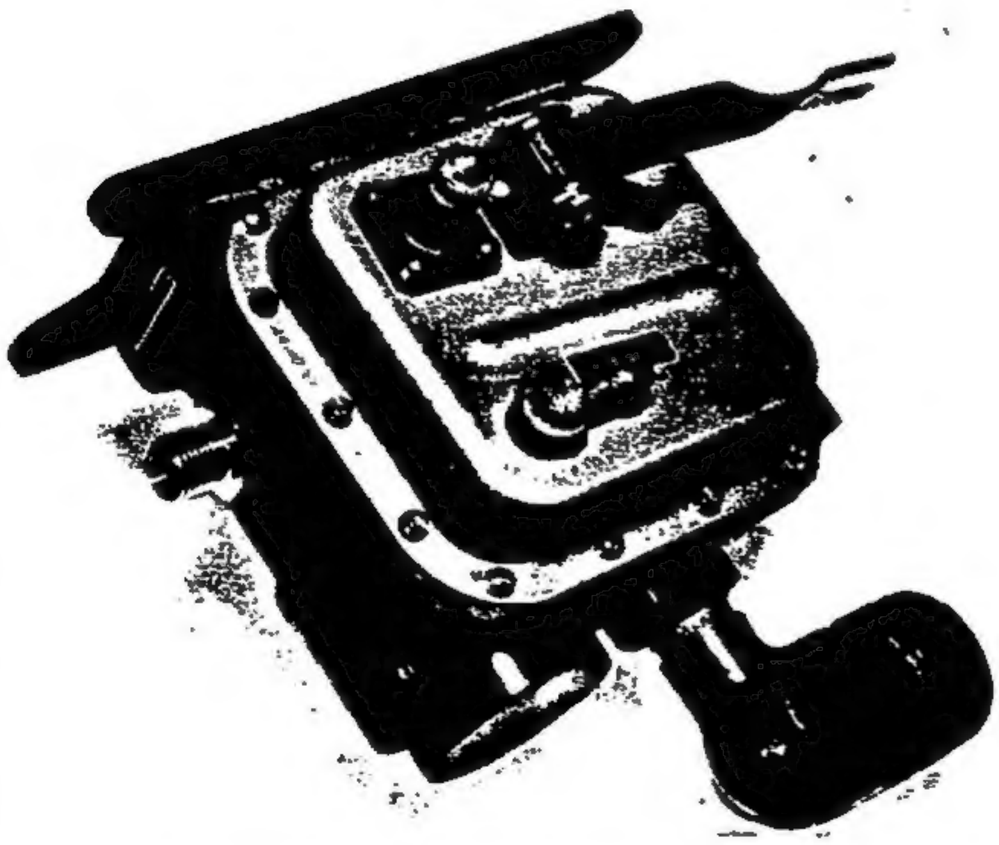
1. This manual provides overhaul instructions with illustrated parts list for Pneumatic Flow Control Unit, part number 803661-01, 803661-03 and 803661-04 (see Figure 1).

2. Purpose of Equipment

   (1) The Pneumatic and Electro-Pneumatic Flow Control Units form part of the aircraft passenger emergency oxygen system when installed in a pressurized cabin. When the cabin pressure drops below a pressure equivalent to the pressures listed in Table 1, the control unit(s) automatically initiates and controls the flow of oxygen from a high pressure gaseous oxygen source to the passenger mask compartments. The system may also be activated at any altitude manually at the Pneumatic Flow Control Unit, or electrically through the Electro-Pneumatic Flow Control Units.

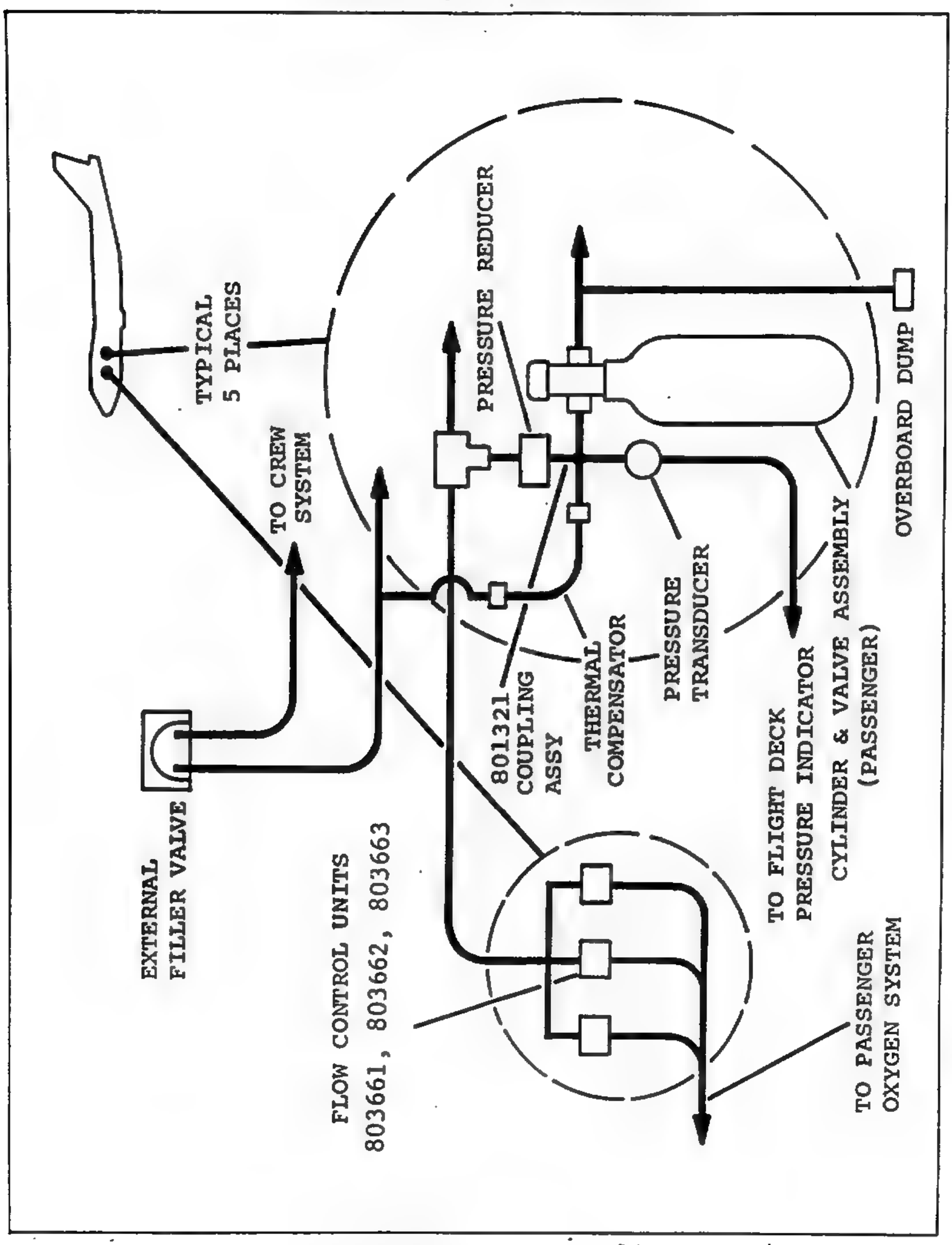
3. Typical Installation

   A. A typical pressurized cabin installation is shown in Figure 2. An oxygen source consisting of a series of high pressure oxygen storage cylinders is connected through pressure reducers to the inlets of flow control units.



Pneumatic Flow Control Unit
Figure 1

   B. The control units are normally closed (OFF). In the event of cabin decompression (cabin pressure drops below the pressures listed in Table 1) the aneroids within control units are preset to automatically actuate and control the flow of oxygen to the passenger emergency oxygen system.



Typical Installation
Figure 2

If required, the system may be actuated electrically by a crew member from the cockpit of the aircraft through control units 803662 and/or 803663, to supply oxygen to the passenger oxygen system. Switches control electrical actuation of control units 803662 and 803663.

Configuration All Series	Actuation Altitude	
	Feet	Meters
-01 and -03	13,250-14,500	4038.6-4419.6
-04	14,000-15,000	4267.2-4572.0

Automatic Acutation Pressure Values
Table 1

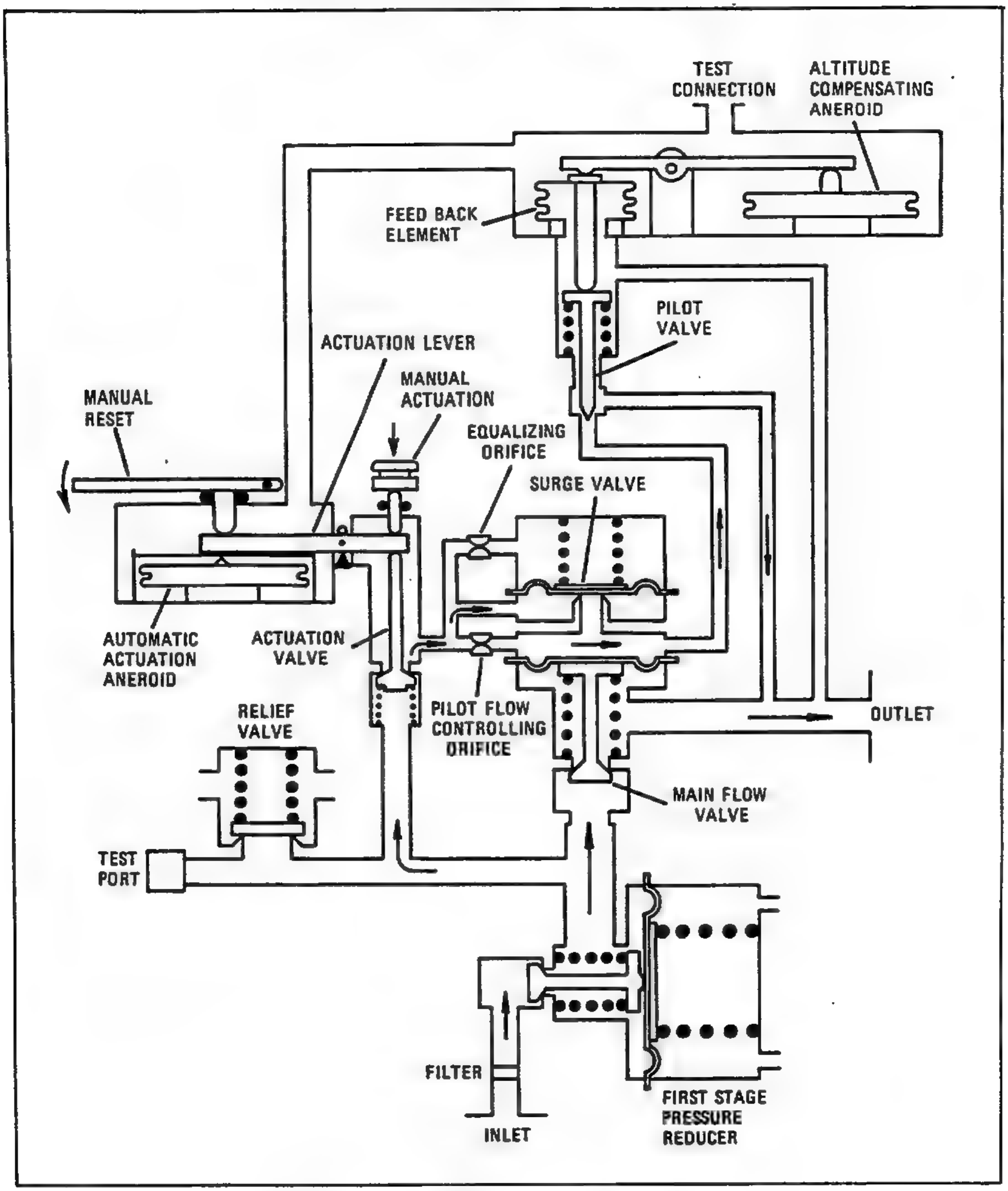
C. When control units 803661 and/or 803662 are activated, lights in the cockpit of the aircraft and in the passenger compartment are illuminated indicating presence of outlet pressure and subsequent flow. This outlet pressure indication is possible through a pressure switch in control unit 803662.

D. When oxygen is required for therapeutic reasons, closing of a switch activates control unit 803663, only, which controls oxygen flow to a therapeutic outlet located at each of the passenger mask compartments.

4. Operation (See Figure 3)

A. Pressure Reducer. When oxygen, at a pressure of 500 psi, is introduced at the inlet of the control unit, the first stage pressure reducer reduces the pressure to a value of approximately 120 psig. This controlled first stage pressure is routed to the pilot-operated main flow control valve and to the actuation valve.

B. Automatic Actuation. At an altitude as listed in Table 1, the aneroid in the automatic actuation mechanism develops sufficient force to overcome the tension of the leaf spring. The increased tension trips the leaf spring past center and moves the lever against the actuation valve, which then opens and allows the first stage pressure to be applied to the pilot flow controlling orifice and to the surge valve.



Schematic of 803661 Flow Control Unit
Figure 3

C. Electrical Actuation (803662 and 803663 only). The system may be actuated electrically at any altitude by energizing a switch in the cockpit of the aircraft. Actuation of the solenoid within the electro-pneumatic control unit overrides a detent causing positive opening and holding of the actuation valve, overriding the automatic mechanism.

D. Manual Reset. (Cabin pressure below 12,000 feet altitude for 803661-01, -03 and -04). After actuation, the control unit may be reset by depressing the reset mechanism. A spring loaded detent holds the units in the "ON" mode until manually reset. The actuation capability is retained after resetting.

E. Pressure Surge (803661 and 803662 units only). When the actuation valve opens, first stage pressure is admitted underneath the surge valve diaphragm. The pressure in the closed volume above the surge valve diaphragm is initially at ambient. At actuation, the sudden large pressure differential opens the surge valve and admits oxygen pressure into the pilot volume above the main flow valve diaphragm. With the surge valve open, the pressure in the pilot volume is then nearly equal to the first stage pressure. This occurs because the restriction to flow between the pressure reducer to the pilot volume is small compared to the restriction from the pilot volume to the unit outlet via the pilot valve.

This pilot surge pressure acting on the main flow control valve diaphragm opens the main valve fully and allows oxygen to flow into the outlet. This flow is sufficiently large to pressurize the aircraft system (approximately 3200 cu. in.) to a pressure of 50 psig in not more than 7 seconds. The outlet pressure can build up to a value slightly less than the first stage pressure by the amount of the bias spring force tending to close the main flow valve.

The pressure in the closed volume above the surge valve diaphragm gradually rises as oxygen flows through the equalizing orifice. After a period of 8 to 20 seconds, when the pressure differential across the surge valve diaphragm is reduced to approximately 10 to 15 psi, a spring closes the surge valve resulting in a definite restriction to flow from the pressure reducer to the pilot volume. The pilot pressure becomes equal to the outlet pressure and the bias spring closes the main flow control valve.

F. Pilot Flow. During normal operation, the pilot oxygen (approximately 2.5 LPM) flows from the first stage through the actuation valve, through the pilot flow controlling ofifice, through the pilot valve and into the outlet. The magnitude of the pilot pressure depends on th relative restriction upstream and downstream of the pilot volume. The upstream restriction consists of the pilot flow controlling orifice and is fixed. The downstream restriction consists of the pilot valve, the opening of which is controlled by the feedback element in response to the difference between the input aneroid force and the counteracting force of the outlet pressure acting on the feedback element.

G. Pilot Operation. The altitude-compensating aneroid exerts a force, tending to close the pilot valve, which is counteracted by the force of the outlet pressure acting on the feedback capsular element, tending to open the pilot valve. The pilot valve moves in the direction of the unbalanced force. If the unit outlet pressure is higher than is demanded by the feedback element, the pilot valve opening increases, the pilot pressure decreases which in turn decreases the opening of the main flow control valve and reduces the output flow. If the feedback element demands a higher outlet pressure than is present in the outlet, the pilot valve opening decreases, increasing the restriction to flow, which raises the pilot pressure and increases the output flow.

H. Altitude Compensation. From ground level to approximately 15,000 feet, the altitude compensating aneroid does not contact the force transmitting lever arm and has no effect on the unit performance.

The feedback capsular element is pre-loaded so that a constant outlet pressure of approximately 2 psig is required to keep the pilot valve open.

At approximately 17,000 feet, the aneroid contacts the lever arm and develops a force, increasing linearly with decreasing ambient pressure, which adds to the pre-load force of the feedback element, and demands a corresponding increase in the outlet pressure.

J. Relief Valve. A high flow capacity pressure relief valve is incorporated to ensure that outlet pressure can never exceed 170 psi.

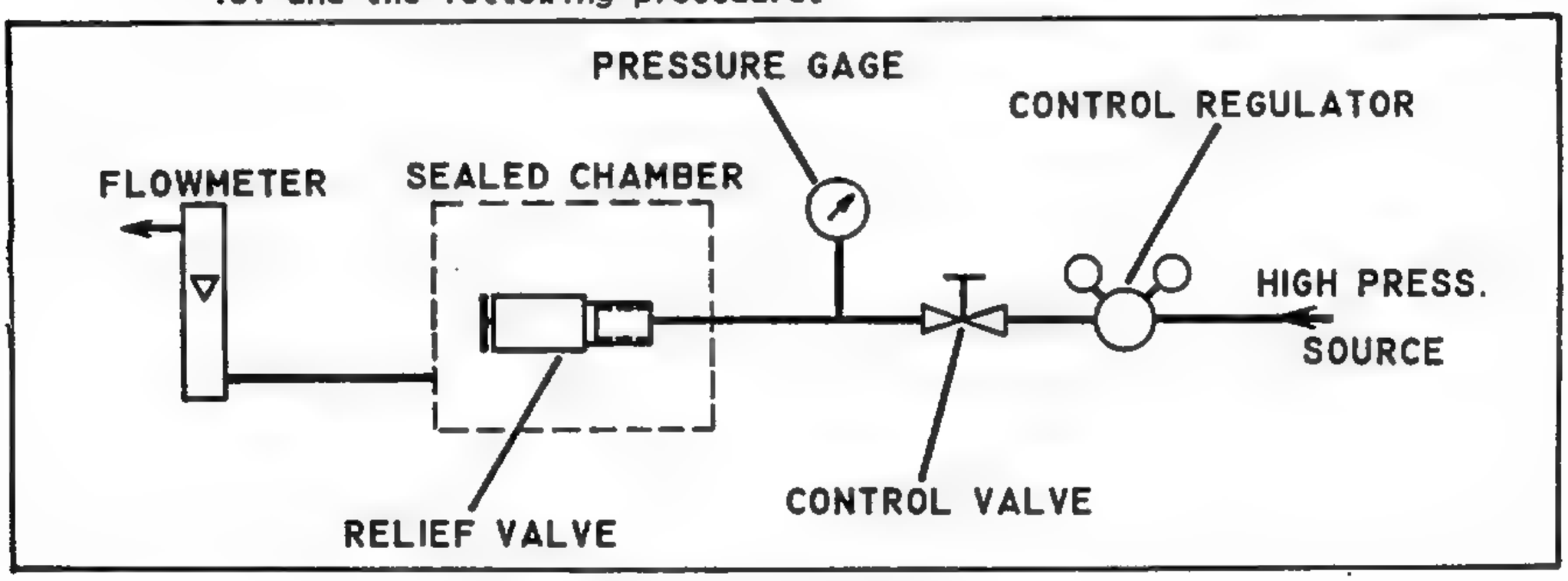
TESTING AND FAULT ISOLATION

CAUTION: OXYGEN CONFORMING TO FEDERAL SPEC. MIL-O-27210, TYPE I, IS USED AS THE TEST GAS WHEN PERFORMING THE TESTS OUTLINED HEREIN. IF NITROGEN OR AIR IS USED, APPROPRIATE DENSITY CORRECTION FACTORS SHALL BE APPLIED TO THE FLOW METER USED, TO CORRECT NOT ONLY THE EFFECT ON THE METER ITSELF, BUT ALSO THE EFFECT ON THE PERFORMANCE OF THE CONTROL UNIT WITH THE LOWER DENSITY GAS. ALL FLOWS ARE NOTED IN LPM (NTPD).

NOTE: When performing test procedures outlined in this section close valve (SS, figure 703), open valve (RR), and place selector valve (PP) in 800801 (up) position unless otherwise noted.

1. Testing

   A. Perform a relief valve assembly test in accordance with figure 101 and the following procedure.



Relief Valve Test Setup
Figure 101

   (1) Gradually increase pressure applied to the relief valve assembly. The relief valve assembly shall open at 140 ± 10 psig.

   (2) Increase pressure to relief valve assembly until a 1270 LPM flow is indicated on flowmeter. The applied pressure required to maintain this flow shall not exceed 170 psig.

   (3) Decrease pressure. Valve shall reseat at 100 psig minimum with a maximum leakage of 0.010 LPM (10 cc/min) NTPD.

B. Adjust packing (605, IPL figure 1) to restrict oxygen flow as follows:

(1) Connect assembled orifice and diaphragm assembly (595 through 630) to a controlled oxygen source.

(2) Apply 90 psi to assembly and adjust setscrew (595) until a 0.45 LPM flow, as measured on a flowmeter is attained.

(3) Stake setscrew (595) in two places to retain setting.

C. Functionally test the assembled control unit in accordance with the following procedures.

(1) Perform an external leakage test (at simulated operating condition) in accordance with figure 102 and the following procedure.

a. Place the unit in a sealed chamber and apply 2000 psi to the inlet and 65 psi to the outlet.

b. External leakage shall not exceed 0.010 LPM (10 cc's per minute) as indicated on flowmeter.

(2) Perform an internal leakage test (at non-operating conditions) in accordance with figure 103 and the following procedure.

a. Apply 2000 psi to the inlet.

b. Leakage shall not exceed 0.005 LPM (5 cc's per minute) as indicated on flowmeter, either during or at end of test.

(3) Perform a flow test in accordance with figure 703 and the following procedure.

a. Open valves (C) and (AA). Close all other valves. Turn switch (L) off.

b. Connect the control unit to outlet (R) and inlet (S) of the test stand. Attach vacuum tubing (T) to the test connection provided on the cover of the control unit.

c. Turn vibrator switch (L) "ON".

d. Slowly turn on external oxygen supply and regulate with regulator (X) for 500 psi indication on gauge (I).

e. Adjust valve (E) until the control unit actuates. (The control unit shall surge at an altitude of 13,250 to 14,500 feet for -01 and -03 units, and 14,000 to 15,000 feet for -04 units, as indicated on altimeter (K).) After the initial pressure surge, vent pressure by opening valve (F).

NOTE: The control unit shall surge to not less than 50 psi as indicated on gauge (H), in 7 seconds maximum.

f. Close valves (F) and (C).

g. Adjust valve (E) for an indication of 40,000 feet on altimeter (K). Open valve (EE) and (LL). Open valve (OO) slowly. Adjust valve (F) for a flow of 25 LPM as indicated on flowmeter (G). Gauge (MM) shall indicate 44.0 to 48.0 psia.

h. Open valve (C).

i. Adjust valve (F) for a flow of 1500 LPM as indicated on flowmeter (G). Gauge (MM) shall indicate 44.0 to 48.0 psia. Close valve (F).

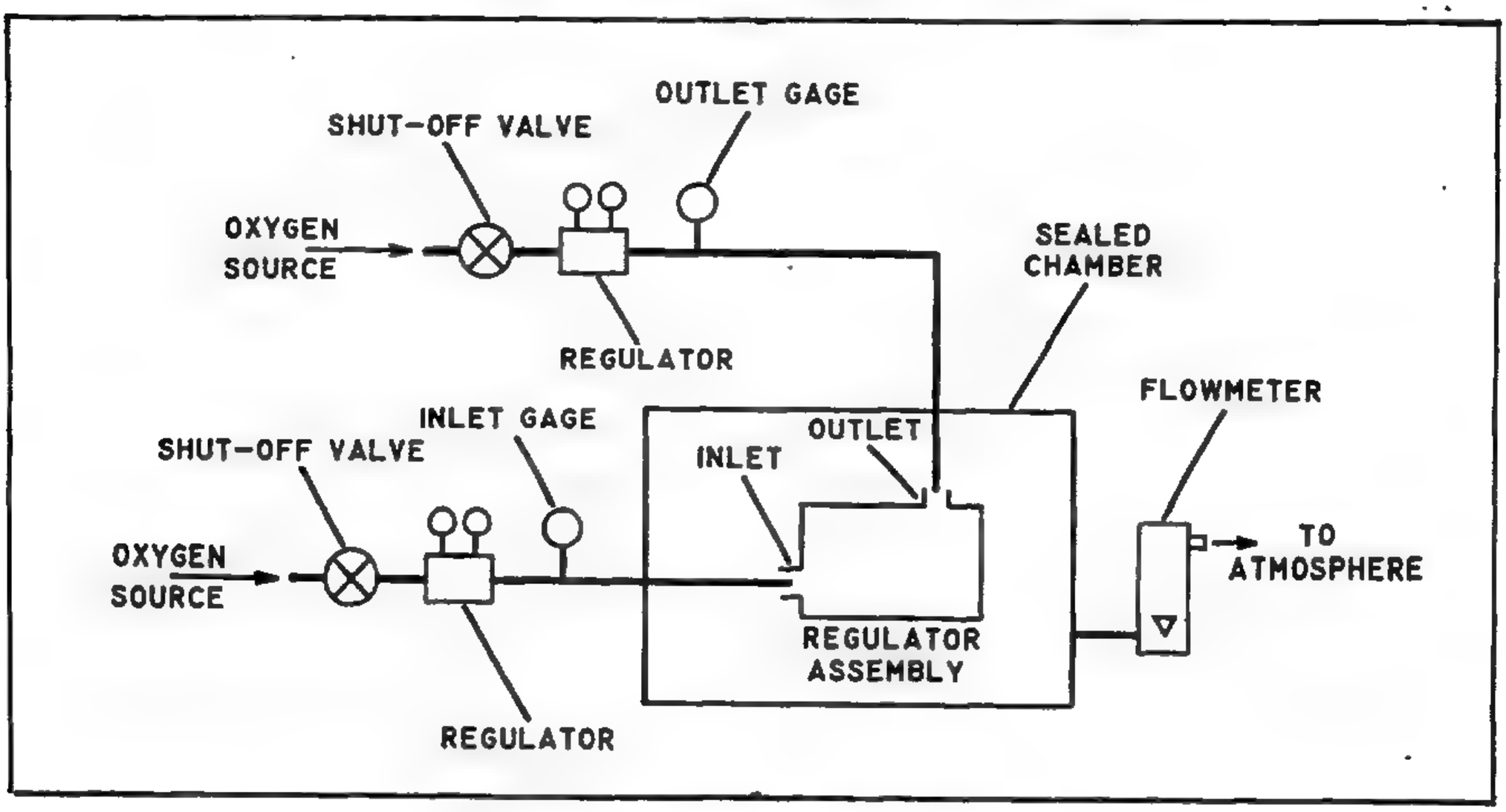
j. Adjust valves (D) and (E) for an indication of 30,000 feet on altimeter (K). Open valve (F) to vent system until gauge (MM) stabilizes. Close valves (F) and (C). Adjust valve (F) until 25 LPM is indicated on flowmeter (G). Gauge (MM) shall indicate 28.1 to 37.6 psia.

k. Open valve (C) and adjust valve (F) for a flow of 1180 LPM as indicated on flowmeter (G). Gauge (MM) shall indicate 28.1 to 37.6 psia. Close valve (F).

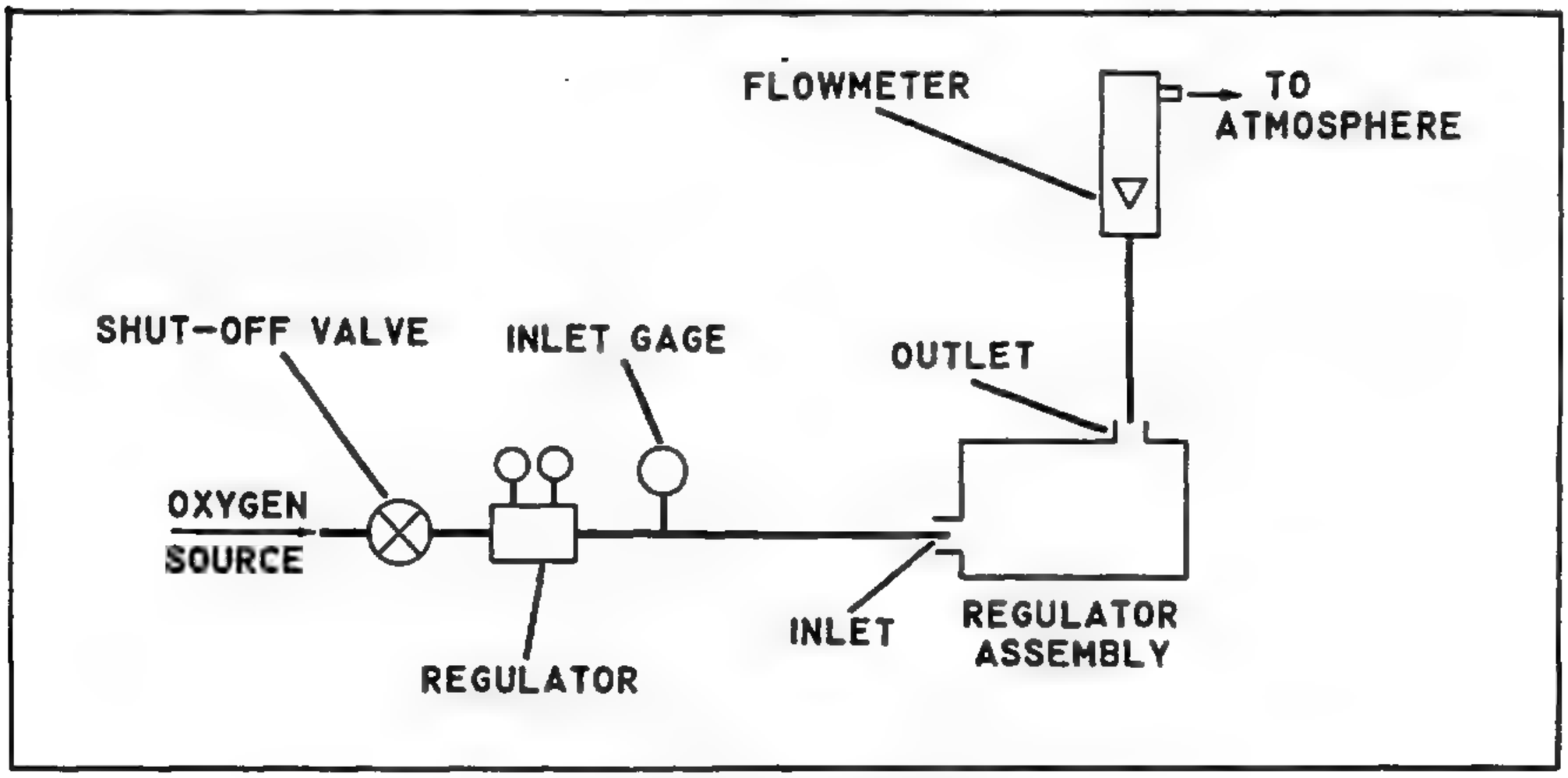
l. Adjust valves (D) and (E) for an indication of 20,000 feet on altimeter (K). Open valve (F) to vent system until gauge (MM) stabilizes. Close valves (F) and (C).

m. Adjust valve (F) until 25 LPM is indicated on flowmeter (G). Gauge (MM) shall indicate 12.6 to 22.0 psia.

n. Open valve (C). Adjust valve (F) for a flow of 680 LPM as indicated on flowmeter (G). Gauge (MM) shall indicate 12.6 to 22.0 psia. Close valve (F).



External Leakage Test Setup
Figure 102



Internal Leakage Test Setup
Figure 103

o. Adjust valves (D) and (E) for an indication of 12,000 feet on -01, -03 and -04 units on altimeter (K). Open valve (F). Manually depress lever assembly (30, IPL Figure 1) (button on 803661-03) on the control unit. Control unit indicator shall indicate "OFF". Close valve (F) Figure 703.

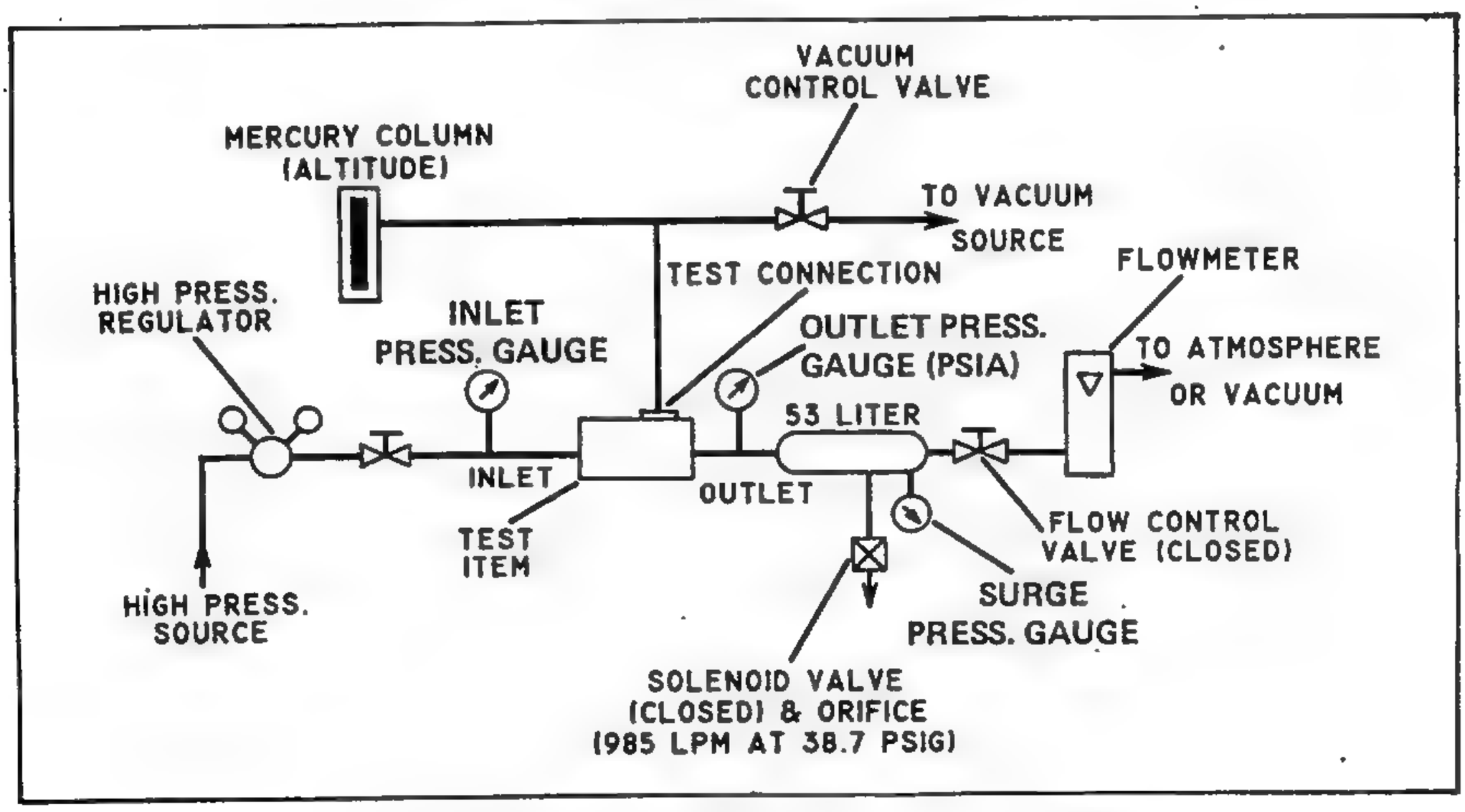
p. Adjust valves (D) and (E) for ground level.

q. Close valves (EE), (LL) and (OO).

(4) Perform a pressure and surge duration test in accordance with Figure 104 and the following procedure.

a. Apply 500 psig to the inlet port.

b. Place valve (PP, Figure 703) in up position, and switch (QQ) in down position.



Inlet Pressure and Surge Duration Test Setup
Figure 104

c. Hold down the manual reset lever or the button on 803661-03 (to prevent actuation) and adjust valves (D) and (E) until an altitude of 30,000 feet is indicated on altimeter (K).

d. Release manual reset lever or button and allow unit to actuate. When surge pressure reaches 50 psig, valve (VV) opens automatically and flow exhausts from outlet (XX).

e. Time the duration from surge initiation until return of outlet pressure to the regulated pressure for 30,000 feet (23.7 to 33.2 psig as indicated on gauge (H)). Time shall be between 8 to 20 seconds.

f. After stabilization of gauge (H) place switch (QQ) in reset position.

g. Place switch (QQ) in "OFF" position and adjust valves (D) and (E) for a ground level indication of altimeter (K).

h. Depress lever (30, IPL Figure 1) or button on 803661-03 to reset unit, open valve (F) Figure 703 and vent system.

(5) Perform an inlet pressure test in accordance with Figure 104 and the following procedure.

a. Close valve (F) Figure 703 and place valve (PP) in down position.

b. Adjust valves (D) and (E) until unit actuates automatically.

c. Open valve (F) fully and vent system.

d. Using regulator (X), adjust inlet pressure to 100 psi as indicated on gauge (I).

e. Adjust valve (E) to attain a 14,000 feet indication on altimeter (K).

f. Close valve (C).

g. Open valves (EE) and (OO).

h. Attach an external flowmeter and a controllable vacuum source to connection (A).

i. Draw a 20 LPM flow. Flow pressures as indicated on gauge (MM) shall be between 9.8 and 10.8 psia.

j. Close valve (F).

k. Adjust valves (D) and (E) for ground level.

l. Depress lever (30, IPL figure 1) to reset unit.

m. Open valve (C, figure 703).

n. Open valve (F) to vent system.

o. Close valves (OO) and (EE).

p. Vent inlet pressure to zero indication on gauge (I) using regulator (X).

q. Remove control unit from test stand.

2. Fault Isolation

A. See Figure 105 for trouble shooting chart.

TROUBLE	PROBABLE CAUSE	REMEDY
Leakage evident when leak testing cover subassembly (125 or -125A, IPL Figure 1) (refer to Assembly, step 3)	Faulty rolled fittings	Seal leaks by applying Hy-Car Latex to joints of rolled fittings
	Screws (105, IPL Fig. 1) not tight enough	Tighten screws
	Faulty gasket (120)	Replace gasket
	Damaged cover subassembly (125 or -125A)	Replace cover subassembly
Leakage evident when leak testing first stage components (refer to Assembly, step 18)	Faulty packing (565)	Replace packing
	Scored, scratched or damaged seat (555)	Replace valve seat
	Valve assembly (540 through 560) loose in body assembly (730)	Tighten valve assembly
	Contamination in valve seat area	Clean contaminated area
Unable to set up first stage pressure (refer to Assembly, step 22)	Punctured or damaged bellofram (525)	Replace bellofram
	Faulty spring (480)	Replace spring
	Spring (480) not seating properly	Check seating of spring
Leakage evident when leak testing valve assembly (385 through 405)	Scored, scratched or damaged seat (400)	replace valve seat
	Scratched seating area or damaged stem (405)	Replace stem

Trouble Shooting Chart (Sheet 1 of 3)
Figure 105

TROUBLE	PROBABLE CAUSE	REMEDY
Leakage evident when leak testing valve assembly (385 through 405) (Continued)	Housing (375) loose	Tighten housing
	Faulty packing (410)	Replace packing
Control unit fails to actuate at proper altitude	Aneroid assembly (330) not adjusted properly	Adjust aneroid assembly per Assembly, step 41.
	Bolt (315) tension not properly adjusted	Adjust per Assembly, steps 29 and 30
	Faulty aneroid assembly (330)	Replace aneroid assembly
Outlet pressure of control unit fails to stabilize at the proper pressure after initial pressure surge	Damaged orifice surface on seat (635)	Replace seat
	Leakage at orifice and diaphragm assembly (595 through 630)	Replace defective parts
	Faulty bellows assembly (225)	Replace bellows assembly
	Pilot flow out of adjustment	Adjust screw (415, IPL figure 1)
	Damaged seat on orifice assembly (630)	Replace orifice assembly
Outlet pressure of control unit fails to stabilize at the proper pressure at altitude	Setscrews (160) not adjusted properly	Adjust setscrews per Assembly, step 41, G., H. and J.
	Pilot flow out of adjustment	Adjust screw (415)
Surge time exceeds 7 seconds maximum	Orifice and diaphragm assembly (595 through 630) not adjusted properly	Adjust orifice and diaphragm assembly per Testing, step B

Trouble Shooting Chart (Sheet 2 of 3)
Figure 105

TROUBLE	PROBABLE CAUSE	REMEDY
Unable to obtain proper slope	Support (200) not positioned properly	Position support per Assembly, step 41.AC, note
Outlet pressure span at altitude not within tolerance	Push pin (240) not free in bellows (225)	Replace push pin
	Damaged seat assembly (255)	Replace seat assembly
	Leakage through gasket (260)	Replace gasket
	Valve assembly (665 through 685) not properly adjusted	Adjust valve assembly (660) per Assembly, step 12.C
	Lever assembly (165 through 190) not free in support (200)	Adjust per Assembly, step 1.A., B., C., and D.
Unscheduled actuation (with or without surge)	Leakage at valve assembly (385 through 405)	Replace seat (400)

Trouble Shooting Chart (Sheet 3 of 3)
Figure 105

DISASSEMBLY (See IPL Figure 1)

1. Remove screws (50) and washers (55) retaining housing (45).

2. Remove cover subassembly (125 or -125A) and gasket (140) from body assembly (730) by removing screws (130) and washers (135); then remove gasket (60), spool (35) by removing nut (40), packing (65) and plunger (70).

3. Remove identification plate (10) from body assembly (730) only if replacement is required.

4. Straighten and remove cotter pin (20) to remove pin (15); then remove washer (25 and 25A) and lever assembly (30).

5. Unthread and remove button (75); then remove washer (80), spring (85) and plunger (95). Remove packing (90) from plunger (95).

6. Remove lens (100) by removing screws (105) and nuts (110); then remove plate (115) and gasket (120).

7. Remove mounting plate (145) by removing screws (150).

8. Remove relief valve assembly (700) from body assembly (730). Then remove packing (705) from relief valve assembly.

9. Remove setscrews (160).

10. Remove lever (165) form support (200) by removing setscrews (190), nuts (175 and 185) and washers (180) from pin (170). Remove setscrew (155) and spring (195).

11. Remove support (200) from body assembly (730) by removing screws (205) and washers (210 and 215).

12. Unthread and remove aneroid assembly (220) by using wrench (7, Figure 901).

13. Using wrench (8), loosen nut (230, IPL Figure 1), unthread and remove bellows assembly (225), remove packing (235) and nut (230) from bellows assembly.

14. Remove pin (240), stem (245), spring (250), seat assembly (255) and gasket (260) from body assembly (730).

15. Remove indicator (270) from lever assembly (310) by removing screws (275) and washer (280).

16. Remove plate (285) from block (355) by removing screws (290) and washers (295).

17. Remove washers (300 and 305) from lever assembly (310). Remove detent assembly (265) from mounting block (355) using wrench (1, figure 901).

18. Remove bolt (315, IPL figure 1) from frame (345) by removing nuts (320). Remove spring (325) from frame (345).

19. Remove setscrew (335) and insert (340) from body assembly (730), then unthread aneroid assembly (330) from body assembly (730).

20. Remove frame (345) from body assembly (730) by removing screws (350).

21. Remove block (355) from body assembly (730) by removing screws (360) and washers (365). Remove packing (370).

22. Unthread and remove housing (375); then disassemble valve assembly (385 through 405) as follows:

    (1) Remove nuts (385 and 390) from stem (405).

    (2) Spring (395) and seat (400) are free to be removed from stem (405).

23. Remove packing (410) from body assembly (730).

24. Remove screw (415) from body assembly (730); then remove packing (420) from groove of screw (415).

25. Unthread and remove plug (425); then remove packing (430) from end of plug (825). Remove union (435), seal (440) and filters (445 and 690) from body assembly (730).

26. Loosen nut (455), unthread and remove elbow (450), packing (460), and remove nut (455) from elbow (450).

27. Remove setscrew (470), insert (475) and retaining cap (465).

    CAUTION: DEPRESS CAP ASSEMBLY (465) WITH WRENCH (6, FIGURE 901) AGAINST LOAD OF SPRING (480, IPL FIGURE 1) TO PREVENT GALLING, WHEN REMOVING CAP ASSEMBLY (465).

28. Remove spring (480), washers (485 and 490) and remove retainer (500) with wrench (6, figure 901). Remove sleeve (495, IPL figure 1).

29. With a rocking motion, remove diaphragm assembly (515 through 530) from body assembly (730). Remove packing (505).

30. Remove dampener (515) by removing screw (520) from piston (530). Remove bellofram (525).

31. Unthread and remove valve assembly (540 through 560) from the body assembly. Remove packing (565) from body assembly (730). Disassemble the valve assembly as follows:

    (1) Unthread head (540) from stem (560).

    (2) Remove spring (545), guide assembly (550), and seat (555) from stem (560).

32. Unthread and remove cap (570). Remove disc (580) and spring (585); then remove packing (575) from end of cap (570).

    NOTE: Use wrench (6, figure 901) to remove cap (570, IPL figure 1).

33. Remove orifice and diaphragm assembly (595 through 630) and disassemble as follows:

    (1) Unthread and remove setscrew (595) from orifice assembly (630); then remove screens (600 and 610) and packing (605) from the orifice assembly.

    (2) Remove nut (615), ring (620) and diaphragm (625) from end of orifice assembly (630).

34. Remove seat (635) and bellofram (645) from body assembly; then remove packing (640) from seat (635).

    NOTE: Use a twist and pull action to remove seat (635) from body assembly (730).

35. Remove plate (650).

36. Remove valve assembly (665 through 685) from body assembly (730).

    NOTE: Use wrench (4, figure 901) to remove valve assembly (665 through 685, IPL figure 1) from body assembly (730).

37. Remove packing (655) from the valve assembly; then disassemble the valve assembly as follows:

    (1) Loosen nut (670) then unthread piston (665) from stem (670). Remove guide and seat assembly (680) and spring (675) from end of stem (685).

    (2) Unthread nut (670) and remove stem (685) from guide and seat assembly (680).

38. Remove screen (695) from body assembly (730).

39. Remove plates (710 and 720) by removing screws (715 and 725) only if the plates are to be replaced.

CLEANING

WARNING: DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS, OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. SUCH MATERIALS, AS WELL AS DUST, LINT, AND FINE METAL FILINGS ARE ALL POTENTIAL COMBUSTIBLES WHICH MIGHT, WHEN EXPOSED TO OXYGEN UNDER PRESSURE, IGNITE AND RESULT IN AN EXPLOSION.

1. Using the materials listed in Table 401, perform the cleaning procedures outlined in the following paragraphs. Equivalent materials may be used.

MATERIAL	DESCRIPTION	MANUFACTURER*	REFER TO PARAGRAPH
Cleaning Agent	1,1,1, Trichloroethane (MIL-T-81533)	V91784	Cleaning, step 3.A

*Refer to Illustrated Parts List, paragraph 2.C for Vendors Code.

List of Cleaning Materials
Table 401

2. Remove dirt and foreign particles from equipment by wiping with a clean, lint-free cloth, or by blowing with clean, oil-free air or nitrogen.

WARNING: USE 1, 1, 1, TRICHLOROETHANE IN A WELL-VENTILATED AREA ONLY. AVOID PROLONGED OR REPEATED CONTACT WITH SKIN AND INHALATION OF TOXIC VAPORS.

3. Metal parts which come in contact with oxygen and have become contaminated can be cleaned as follows:

   A. Use a vapor degreasing method with stabilized 1, 1, 1, Trichloroethane conforming to Specification MIL-T-81533. Blow clean and dry with a stream of clean, dry, oil-free air or nitrogen.

CHECK

1. Carefully inspect all metal parts for cracks, nicks, dents, burrs or tool marks which might cause malfunction of the control unit.

2. Inspect aneroids (220 and 330, IPL figure 1) and bellows assembly (225) for dents and cracks and any other signs of damage.

3. Inspect all filters for contamination, corrosion, or damage.

4. Inspect all threads for burrs and signs of damage.

5. Inspect all valve seats for scoring, scratches, contamination and other damage.

6. Inspect all parts for obvious damage.

REPAIR

1. Repair of parts, other than removing burrs and chasing threads, is not recommended.

2. Replace gaskets (60, 140, and 260, IPL figure 1), washer (300), and packings (65, 90, 235, 370, 410, 420, 430, 460, 505, 565, 575, 640, 655, and 705).

3. Replace packing (605).

4. Replace diaphragm (625).

5. Replace belloframs (525 and 645).

6. Replace all non-metallic parts except guide assembly (550) and cap assembly (465).

7. Replace filter (690).

8. Replace screens (600 and 610).

9. Replace all obviously defective or damaged parts.

ASSEMBLY (See IPL Figure 1)

NOTE: Table II lists the consumable materials necessary for assembly and testing. Equivalent materials may be used except for oxygen lubricant.

MATERIAL	DESCRIPTION	MANUFACTURER*	REFER TO ASSEMBLY STEP
Glyptal	#1201 (Red)	V08800	1.C 8.B 40.D 41.AC 43
Oxygen Lubricant	Krytox 240 AC	V18873	2.B 37
Leak Test Solution	Snoop (MIL-L-25567)	V18034	3C 18.B
Loctite	Grade B	V05972	35.A
Loctite	Grade C	V05972	2.C 5.B 10.C 21 23 25 43
Lubricating Powder	Fluoroglide 200 Dry Lubricant	V18632	21 34
Oxygen	MIL-O-27210, Type I	V07098	3.B
Torque Paint (Tinted Pink)	Temp-Alarm Type 43E	V82682	17, 38, 45, 47, 48, 50, 51
Latex Sealant	HyCar Latex	V91427	2.A

*Refer to Illustrated Parts List paragraph 2.C for vendor codes.

List of Consumable Materials for Assembly
Table 701

NOTE: When performing tests required during assembly procedure, close valve (SS, Figure 703), open valve (RR) and place selector valve (PP) in 800801 (UP) position unless otherwise noted.

1. Assemble items 155 through 190 to item 200 as follows:

   A. Thread setscrew (155) into lever (165) until the screw is flush with the top of the lever.

   B. Thread setscrews (160) into lever (165) until the setscrews are flush with the top of the lever.

      NOTE: To restrict pin (170) from rotating when assembled to support (200), prick punch side of pin (170) to create an interference fit between pin (170) and support (200).

   C. Assemble lever (165) to support (200) with pin (170), and secure with nuts (175) and washers (180).

      NOTE: Apply Glyptal to nuts (175) and washers (180), prior to installing.

   D. Assemble setscrews (190) and nuts (185) to support (200).

2. Set the items assembled in step 1 aside, and assemble items 75 through 120 to cover subassembly (125 or -125A) as follows:

   A. Assemble gasket (120), plate (115) and lens (100) to cover subassembly (125 or -125A) with screws (105) and nuts (110).

      NOTE: Apply a thin coat of latex to threads of screws (105) and around edge of plate (115) to form a seal between plate (115) and lens (100).

      CAUTION: AVOID APPLICATION OF KRYTOX TO THREADED AREAS.

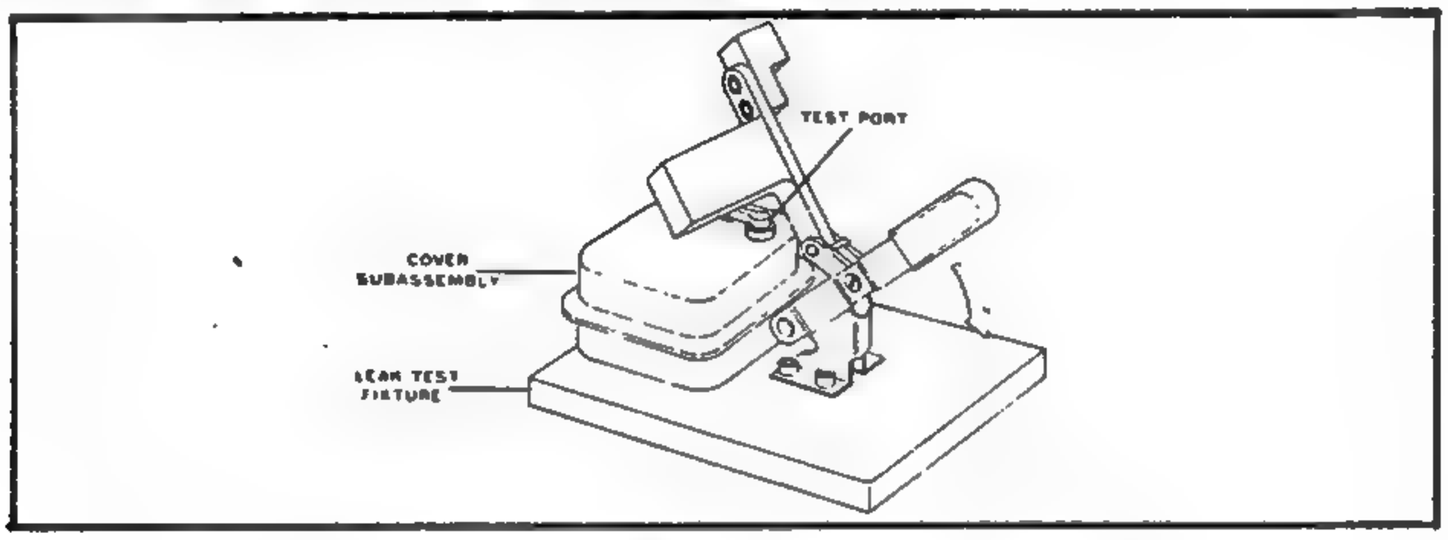
   B. Lubricate packing (90) sparingly with Krytox and assemble on plunger (95) using stylus (9, Figure 901).

   C. Place plunger (95, IPL Figure 1) with packing (90) installed, through cover subassembly (125 or -125A). Place washer (130) on end of plunger (95). Place spring (85) in place and thread button (75) onto plunger (95) after applying Loctite, Grade C, to threads of plunger.

CAUTION: OXYGEN CONFORMING TO FEDERAL SPEC. MIL-O-27210, TYPE I, IS USED AS THE TEST GAS WHEN PERFORMING THE TESTS OUTLINED IN ASSEMBLY. IF NITROGEN OR AIR IS USED, APPROPRIATE DENSITY CORRECTION FACTORS SHALL BE APPLIED TO THE FLOW METER USED, TO CORRECT NOT ONLY THE EFFECT ON THE METER ITSELF, BUT ALSO THE EFFECT ON THE PERFORMANCE OF THE CONTROL UNIT WITH THE LOWER DENSITY GAS.

3. Leak test cover subassembly (125 or -125A) in accordance with Figure 701 and the following procedure.

   A. Place unit under test in leak test holding fixture (2, Figure 901) and lock in place with handle.



Cover Subassembly Leak Test Setup
Figure 702

   B. Apply 15 psi to test port.

   C. Coat all rolled fittings and area of lens (100, IPL Figure 1) with leak test solution. No leakage shall be evident. Refer to Figure 105 for remedial action.

   D. After completion of test, close off oxygen source, remove unit from test setup, blow dry with a stream of clean, dry, oil-free air and continue assembly.

4. Set the items assembled in step 3.A., B., and C. aside, and assemble items 701 through 750 to body assembly (730, IPL Figure 1) as follows:

   A. Attach plates (710 and 720) to body assembly (1460) with screws (715 and 725) if the plates were removed.

5. Assemble items 270 through 285 and 300 and 305 to lever assembly (310) as follows:

   A. Insert plate (285) on lever assembly (310).

B. Assemble indicator (270) to lever assembly (310) with screw (275) and washer (280). Apply Loctite, Grade C, to screw (275) prior to assembly.

C. Place washers (300 and 305) on opposite end of lever assembly (310).

NOTE: Place flat side of washer (300) against washer (305).

6. Set item assembled in step 5.A., B., and C. aside.

7. Install packing (65) on plunger (70) using stylus (9, Figure 901). Insert plunger (70, IPL Figure 1), into hole of housing (45). Secure spool (35) to plunger (70) with nut (40).

8. Assemble items 15 through 30 on cover subassembly (125) as follows:

A. Secure lever assembly (30) to cover subassembly (125) with pin (15).

B. Retain pin (15) with cotter pin (20) and washers (25 and 25A). Apply Glyptal to pin (15), cotter pin (20) and washers (25 and 25A).

9. Install filters (445) and (690) and screen (695) into body assembly (730).

10. Assemble valve assembly (540 through 560) as follows:

A. Place seat (555) and guide assembly (550) on stem (560).

NOTE: Chamfer side of seat (555) is next to guide assembly (550).

B. Place spring (545) in place in guide assembly (550).

C. Secure these items together by threading head (540) onto stem (560). Torque tighten in accordance with Table 801.

CAUTION: ALLOW SUFFICIENT DRYING TIME TO PREVENT LOCTITE FROM RUNNING INTO BORE OF GUIDE ASSEMBLY (550).

NOTE: Apply Loctite, Grade C, to threads of item (560) prior to assembly. After applying Loctite, rest the item on the face of head (540) and allow to dry.

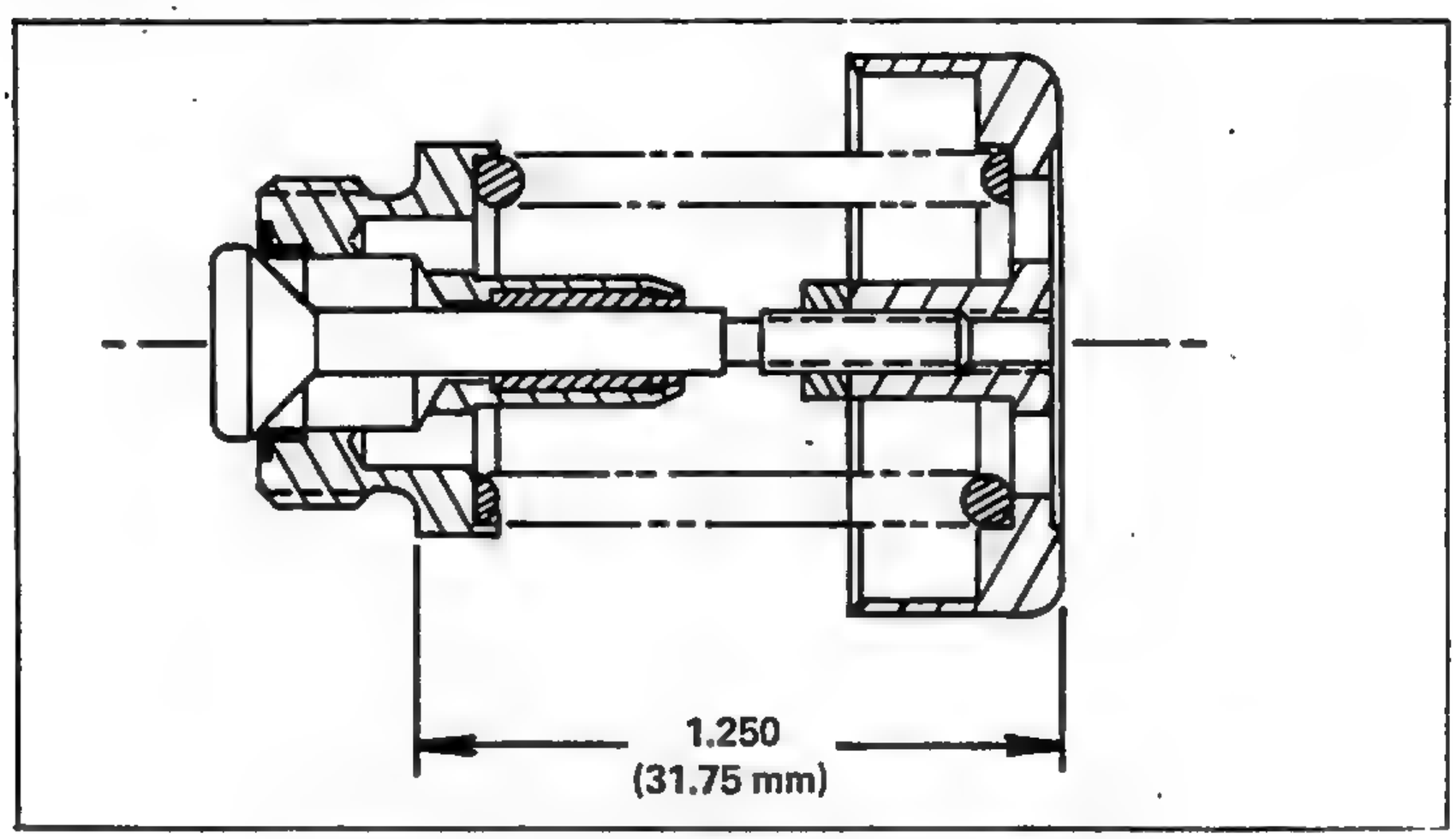
11. Place packing (565) in groove provided in body assembly (730). Thread assembled valve assembly (540 through 560) (refer to step 10) into body assembly (730) and torque tighten in accordance with Table 801.

12. Assemble valve assembly (665 through 685) as follows:

A. Place guide and seat assembly (680) on stem (685).

B. Thread nut (670) onto stem (685).

C. Place spring (675) and guide and seat assembly (680) in place and thread piston (665) onto stem (685). Adjust piston (665) for dimension specified in figure 702. After adjustment, torque tighten nut (670, IPL figure 1) against inside face of piston (665) in accordance with Table 801.



Flow Control Valve Assembly Adjustment
Figure 702

13. Place packing (655) in groove of guide and seat assembly (680). Place assembled valve assembly (665 through 685) into body assembly (730) using wrench (4, figure 901) until physically restricted.

14. Assemble valve assembly (385 through 405, IPL figure 1) as follows:

A. Place seat (400) and spring (395) onto stem (405). Coin seat (400) after assembly, using stem (405).

B. Thread nuts (385 and 390) onto stem (405). Adjust and lock nuts (385 and 390) so that the overall length from the bottom face of seat (400) to the top of nut (385) is 1.090 inches (27.7 mm). Place packing (410) in groove of seat (400) using stylus (9, figure 901).

15. Place assembled valve assembly (385 through 405, IPL figure 1) into body assembly (730). Thread housing (375) into body assembly (730). Place packing (370) in groove of block (355) and secure block (355) to body assembly (730) with screws (360) and washers (365).

16. Place flat side of seal (440) against hex of union (435). Thread nut (455) on elbow (450) and place packing (460) on elbow (450). Place items assembled above aside.

17. Place packing (705) onto relief valve (700). Prior to assembly of relief valve (700) into body assembly (730), test in accordance with Testing, step A. Screw relief valve (700) into body assembly (730). Apply torque paint to relief valve (700) at body (730) after assembly. Place packing (430) on plug (425) using stylus (9, figure 901) and screw into test port of body assembly (730, IPL figure 1).

18. Leak test the first stage of the control unit in accordance with figure 703 and the following procedure.

    A. Close all test stand valves and switches and connect the unit inlet to connection (S), rotating the control unit so that first stage components are facing up. Connect a 2000 psi oxygen source to connection (W). Adjust regulator (X) for an indication of 200 psi on gauge (I).

    B. Cap the first stage area with a #10 rubber stopper equipped with a vent tube. Apply leak test solution across vent tube, no leakage shall be evident.

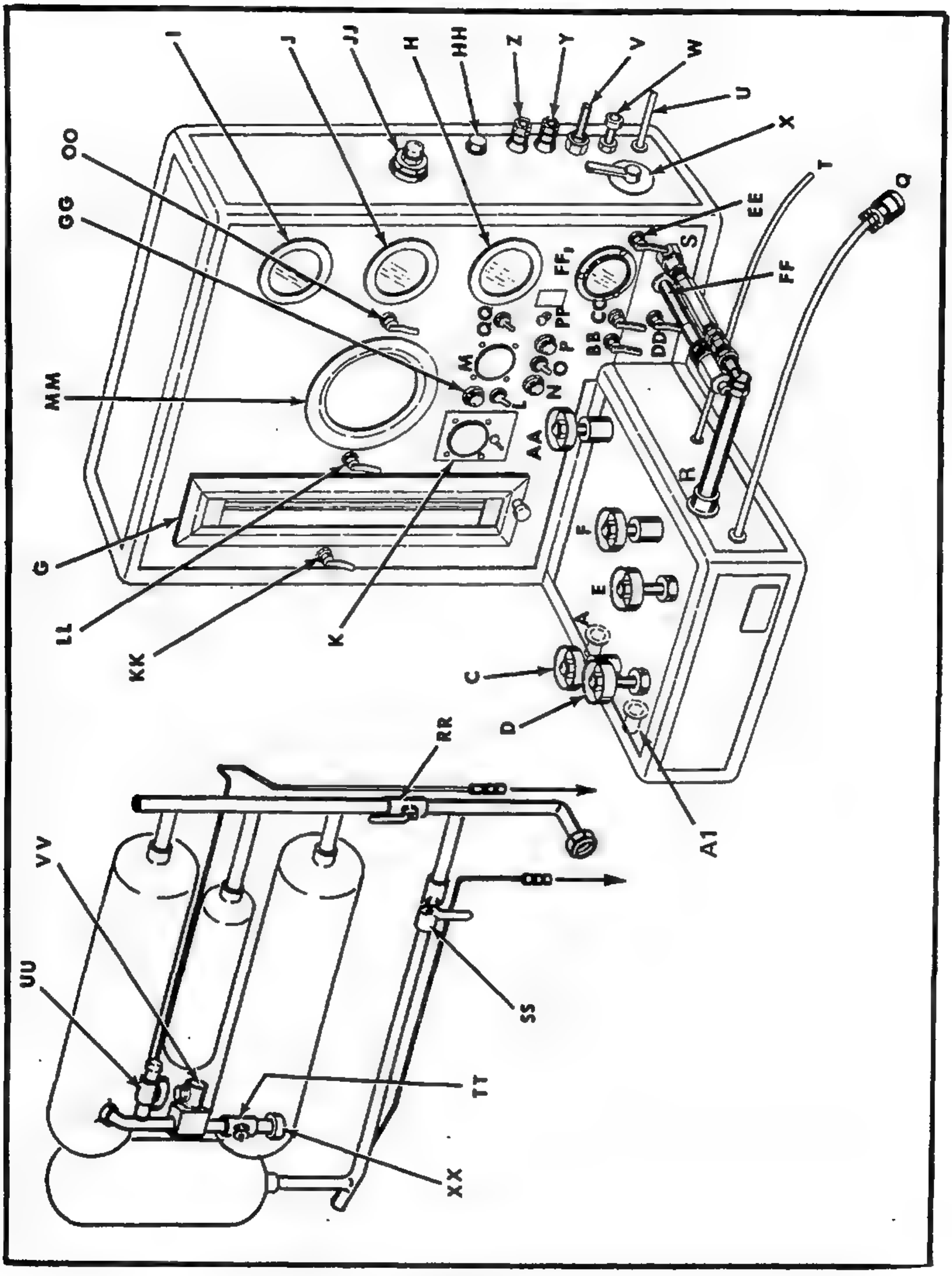
    C. After completion of test, adjust regulator (X) to bleed pressure from the test setup, remove the unit from the test stand, blow dry with a stream of clean, dry, oil-free air and continue assembly.

19. Place packing (420) in groove of screw (415) using stylus (9, figure 901).

20. Thread screw (415, IPL figure 1) into body assembly (730) until screw is flush with body assembly (730).

21. Place packing (505) in groove of dampener (515). Position dampener (515) and bellofram (525) with fabric side against head of piston (530), secure with screw (520) and torque tighten in accordance with Table 801. Apply Loctite, Grade C, to screw (520) at assembly and allow sufficient time to dry. Dust bellofram (525) with lubricating powder and place assembled diaphragm assembly (515 through 530) in body assembly (730). Insert sleeve (495) and thread retainer (500) into body assembly (730) using wrench (6, figure 901) and torque tighten in accordance with Table 801.

NOTE: Apply sufficient pressure to wrench (6) to facilitate thread engagement.



Test Stand
Figure 703

Legend for Figure 703

A_1.	Connection for external flowmeter
A.	Connection for external flowmeter
B.	Valve (HIGH FLOW/LOW FLOW) (located on underside of deck)
C.	Valve ON (high) - OFF (low) flow selector
D.	Valve (vent)
E.	Valve (vacuum)
F.	Valve (flow control)
G.	Flowmeter
H.	Outlet Pressure Gauge (0-160 psi)
I.	Inlet Pressure Gauge (0-3000 psi)
J.	Outlet Pressure Gauge (0-60 psi)
K.	Altimeter
L.	Switch (vibrator)
M.	Oxygen Pressure Indicator
N.	Light (green)
O.	Switch (energize solenoid)
P.	Light (red)
Q.	Electrical Connector (to unit under test)
R.	Connection (to outlet of test unit)
S.	Connection (to inlet of test unit)
T.	Vacuum Tubing (to test port of test unit)
U.	Electrical Cable (to 110 VAC outlet)
V.	Connection (to external vacuum source)
W.	Connection (to external oxygen/air/nitrogen source)
X.	Regulator (regulates oxygen/air/nitrogen to test stand)
Y.	Connection (for positive lead of 28 VDC external power source)
Z.	Connection (for negative lead of 28 VDC external power source)
AA.	Valve (volume cylinder shut-off)
BB.	Valve (back pressure)
CC.	Valve (first stage pressure)
DD.	Valve (vent)
EE.	Valve (gauge J shut-off)
FF.	Connection (to test port of test unit)
FF_1.	Gauge (0-160 psi - first stage back pressure)
GG.	Light (indicator for vibrator)
HH.	Fuse (115V vibrator circuit)
JJ.	Regulator (first stage relief and back pressure)
KK.	Valve (25 LPM surge vent)
LL.	Manometer shut-off and calibration valve
MM.	0-100 psi gauge
OO.	Valve (gauge MM shut-off)
PP.	Surge System selector valve
QQ.	Surge relay reset switch
RR.	800801 Surge System shut-off valve
SS.	22504-22505 Surge System shut-off valve
TT.	985 LPM controllable orifice (valve)
UU.	Surge pressure switch
VV.	Surge solenoid valve
WW.	Surge relay
XX.	985 LPM Surge outlet

22. Place washer (490, IPL figure 1), spring (480) and washer (485) in body assembly (730). Thread cap assembly (465) into the housing assembly using wrench (6, figure 901). Adjust the first stage pressure and leak test actuation valve assembly (385 through 405, IPL figure 1) in accordance with figure 703 and the following procedure.

    A. Remove plug (425) from body assembly (730).

    B. Connect the control unit to connection (S, figure 703) and connection (R) of the test stand. Connect connection (FF) to test port of unit under test. Close all other test stand valves and switches and place valve (PP) in down position. Adjust regulator (X) for an indication of 500 psi on gauge (I).

    C. Adjust cap assembly (465, IPL figure 1) for an indication of 120 psi on gauge (FF_1, figure 703). Actuate valve (DD) intermittently during adjustment of cap (465, IPL figure 1).

        NOTE: Use wrench (6, figure 901) to adjust the cap assembly.

    D. Pour sufficient distilled water into opening of block (355, IPL figure 1) to cover actuation valve assembly (385 through 405). No leakage shall be evident.

        NOTE: Use water sparingly. After leakage check, drain excess water and blow dry with stream of clean, dry, oil-free air.

    E. After adjustment, manually exercise flow control valve assembly (665 through 685) several times. Check gauge (FF_1) for an indication of 120 psi. First stage pressure shall remain at 120 psi after exercising the flow control valve assembly.

        NOTE: If first stage pressure cannot be set at 120 psi, refer to figure 105 for remedial action.

23. Apply a coating of Loctite, Grade C, to threads of aneroid assembly (220), then thread aneroid assembly into body assembly (730) using wrench (7, figure 901).

24. Position frame (345, IPL figure 1) on body assembly (730) aligning mounting holes of the frame with holes in the body assembly. Thread alighnment tool (11, figure 901) through the large diameter hole in frame (345, IPL figure 1) and into the hole provided for aneroid assembly (330) in body assembly (730), until the tool bottoms out on the surface of body assembly (730).

25. With alignment tool in place, adjust frame (345) until mounting holes are aligned with holes in body assembly (730). Secure the frame to body assembly (730) with screws (350) and apply Loctite Grade C to screws (350). Unthread the alignment tool from the housing assembly.

26. Vent contained pressure from system using regulator (X, figure 703).

27. Carefully thread aneroid assembly (330, IPL figure 1) into body assembly (730) until it bottoms out finger tight. Mount the items assembled in step 5 to block (355) with screws (290) and washers (295).

28. Position spring (325) between lever assembly (310) and aneroid assembly (330). Position the spring so that the ends of the spring line up with the slots of frame (345).

29. Thread one nut (320) onto end of bolt (315). Slide bolt (315) through holes in frame (345) and thread on other nut (320). Turn nuts until ends of spring (325) are secured in slots of frame (345).

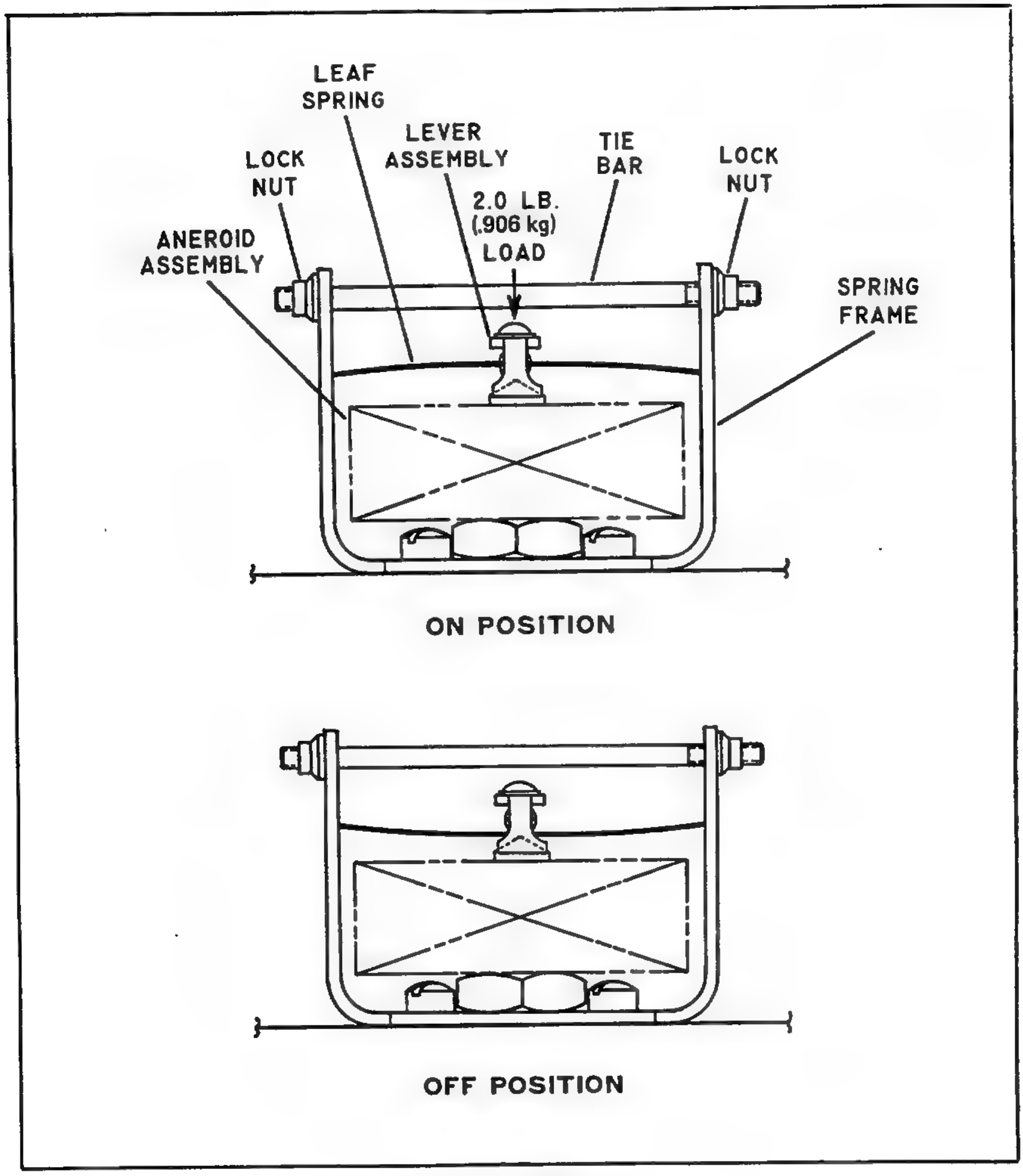
30. Turn in nuts (320) until spring (325) is in "ON" position as illustrated in figure 704. Adjust the nuts until the leaf spring snaps to the "OFF" position when a load of 2.0 pounds (.906kg) is applied to lever assembly (310, IPL figure 1) and spring (325) as illustrated in figure 704. Apply Glyptal to nuts (320, IPL figure 1) and tie bolt (315).

31. Install gasket (260) into port of body assembly (730) and then thread seat assembly (255) into body assembly (730). Place spring (250) and stem (245) into port of body assembly (730). Thread nut (230) onto bellows assembly (225). Place packing (235) in groove of bellows assembly (225) using stylus (9, figure 901).

32. Insert pin (240, IPL figure 1) into bellows assembly (225); then thread the bellows assembly (225) into body assembly (730) until packing (235) seats in chamfer provided in body assembly (730).

33. Install insert (340) and setscrew (335) into body assembly (730); do not tighten.

34. Place plate (650) against face of piston (665). Place packing (640) in groove without hole, of seat (635). Dust bellofram (645) with lubricating powder and place over lip of seat (635), fabric side out.



Leaf Spring Adjustment
Figure 704

35. Assemble orifice and diaphragm assembly (595 through 630) as follows:

A. Place diaphragm (625) and ring (620) on orifice assembly (630) and secure in place with nut (615). Apply Locite, Grade B, to threads of nut (615) prior to assembly.

B. Place screen (610), packing (605) and screen (600) into orifice assembly (630). Secure these items in the orifice assembly with setscrew (595).

NOTE: Prior to installing assembled orifice and diaphragm assembly (595 through 630) into body assembly (730), test in accordance with procedures in Testing, step B.

36. Place assembled orifice and diaphragm assembly (595 through 630) in body assembly (730).

37. Place disc (580) and spring (585) into cap (570). Lubricate packing (575) with Krytox and place in groove of cap (570).

38. Thread cap (570) into body assembly (730) until cap (570) bottoms, using wrench (5, figure 901). Apply torque paint to cap (570, IPL figure 1) at body (730) after assembly.

39. Insert test plug (13, figure 901) into block (355, IPL figure 1).

40. Mount the items assembled in step 1. to body assembly (730) as follows:

A. Place spring (195) over setscrew (155).

B. Mount support (200) to body assembly (730) with screws (205) and washers (210 and 215).

NOTE: Before tightening screws (205), align center of setscrew (160) with tip of bellows assembly (225), and center of other setscrew (160) with tip of aneroid assembly (220).

C. Assemble and adjust setscrews (190) so that lever (165) has 0.001 inch (0.254mm) clearance from support (200) and moves freely. Then tighten nuts (185).

D. Apply Glyptal to nuts (185) and setscrews (190).

E. Depress lever (165) at aneroid (220) and adjust setscrew (155) until lever (165) is horizontal.

F. Adjust setscrews (160) to apply restraining pressure to bellows assembly (225).

41. Adjust and test the partially assembled control unit in accordance with figure 703 and the following procedure.

A. Connect the control unit to the test stand at connection (R), connection (S), and connection (FF).

B. Slowly turn on external oxygen supply. Adjust regulator (X) for 500 psi indication on gauge (I).

C. Open valves (C) and (AA).

D. Thread screw (415, IPL figure 1) into body assembly (730) 6 revolutions.

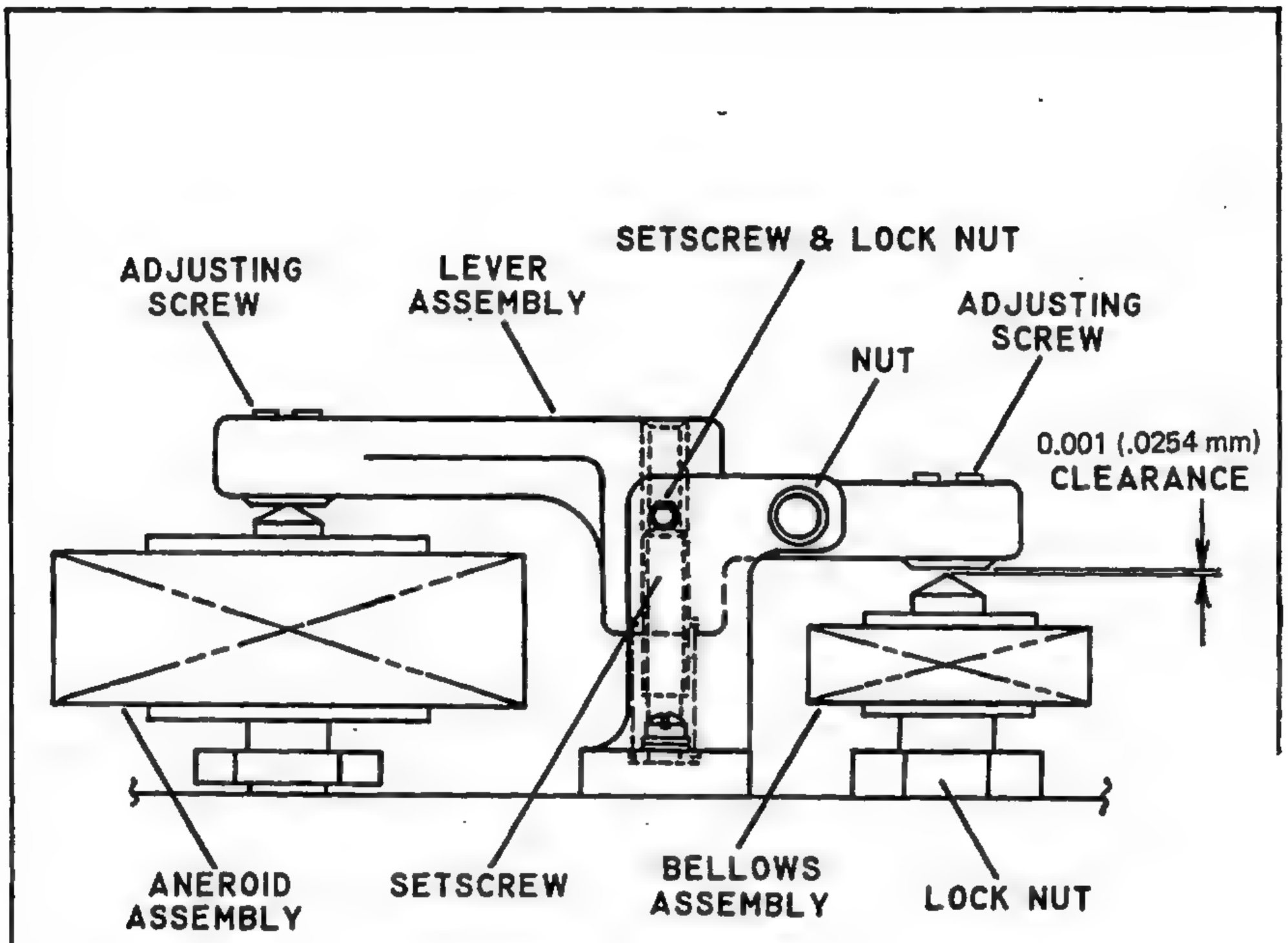
E. Manually snap spring (325) to "ON" position. The control unit shall surge as indicated on gauge (H), figure 703. Adust valve (F), to 1/4 open position. If pressure on gauge (H) remains near first stage pressure, leave valve (F) opened slightly and adjust screw (415, IPL figure 1) (clockwise) until pressure indication drops on gauge (H), figure 703. Keep adjusting screw (415, IPL figure 1) slowly until only a slight flow is heard at outlet of stand.

F. Close valves (C) and (AA) figure 703. Attach a flowmeter to connection (A) and adjust screw (415, IPL figure 1) for an indication of 1.3 LPM on flow meter. Open valve (AA) figure 703, close valve (F) and remove flowmeter from connection (A).

G. Loosen setscrew (160, IPL figure 1) over bellows assembly (225), and place valve (EE) figure 703 in "ON" position.

H. Loosen nut (230, IPL figure 1) and adjust bellows assembly (225) clockwise for a 1.3 psi indication on gauge (J) figure 703. Open valve (LL), and adjust valve (F) for an indication of 25 LPM on flowmeter (G). Lock bellows assembly (225, IPL figure 1) with nut (230). Recheck pressure and readjust if required. Close valve (EE) figure 703.

J. Adjust setscrew (160, IPL figure 1) until a clearance of 0.001 inch (.0254mm) is attained between setscrew (160) and bellows assembly (225) (see figure 705). Lever (165, IPL figure l) shall be manually bottomed against setscrew (155) when this is adjusted.



Lever Assembly Adjustment
Figure 705

K. Manually reset spring (325). Place valve (C, Figure 703) in "ON" position. Close valve (F). Vent contained pressure through regulator (X). Attach vacuum tubing (T) to test port of test cover (12, Figure 901) and place the test cover on the control unit. Close valve (D, Figure 703) and open valve (E) until spring (325, IPL Figure 1) emits an audible click. The click shall occur between 13,900 and 14,100 feet as indicated on altimeter (K, Figure 703) for -01 and -03 units, and for -04 units between 14,400 and 14,600 feet.

L. Close valve (E), open valve (D) to return system to ground level.

M. Adjust position of aneroid assembly (330, IPL Figure 1) by trial and error until proper altitude actuation occurs.

N. Tighten aneroid locking setscrew (335).

NOTE: Loosen setscrew (335) for each new position of the aneroid assembly (330). retighten setscrew prior to rechecking for altitude actuation.

P. Manually reset spring (325) to "OFF" position.

R. Apply 500 psi to system using regulator (X, Figure 703) and indicated on gauge (I).

S. Place test cover (12, Figure 901) on unit under test.

T. Close valve (D, Figure 703) and adjust valve (E). While adjusting valve (E), watch gauge (H). Using a stop watch, check the time elapsed from control unit turn on (surge) until the surge reaches 50 psi minimum. Time elasped shall be a maximum of 7 seconds. Turn on altitude shall be between 13,250 and 14,500 feet for -01 and -03 units between 14,000 and 15,000 feet for -04 units.

NOTE: If time elapsed is more than 7 seconds or a minimum of 50 psi is not attained, check for 0.001 (.0254mm) clearance (See Figure 705) or replace packing (605, IPL Figure 1) and adjust setscrew (1190). After any adjustment of setscrew (595), repeat step T to ensure elapsed time of 7 seconds maximum.

U. Close valve (LL, figure 703) and vent system by opening valve (F).

V. Close valves (C) and (F). Adjust valve (E) for 20,000 feet indication on altimeter (K), open valves (EE) and (OO) and check indicated pressure on gauge (MM).

W. Open valve (LL) and adjust valve (F) for a flow indication of 25 LPM on flowmeter (G). Pressure indication on gauge (MM) shall be between 12.6 and 22.0 psia.

Y. If pressure is not between 12.6 and 22.0, close valves (F) and (E), open valve (D) and return system to ground level. Remove test cover and adjust setscrew (160, IPL figure 1) over aneroid (220). To increase pressure indication turn setscrew (160) clockwise.

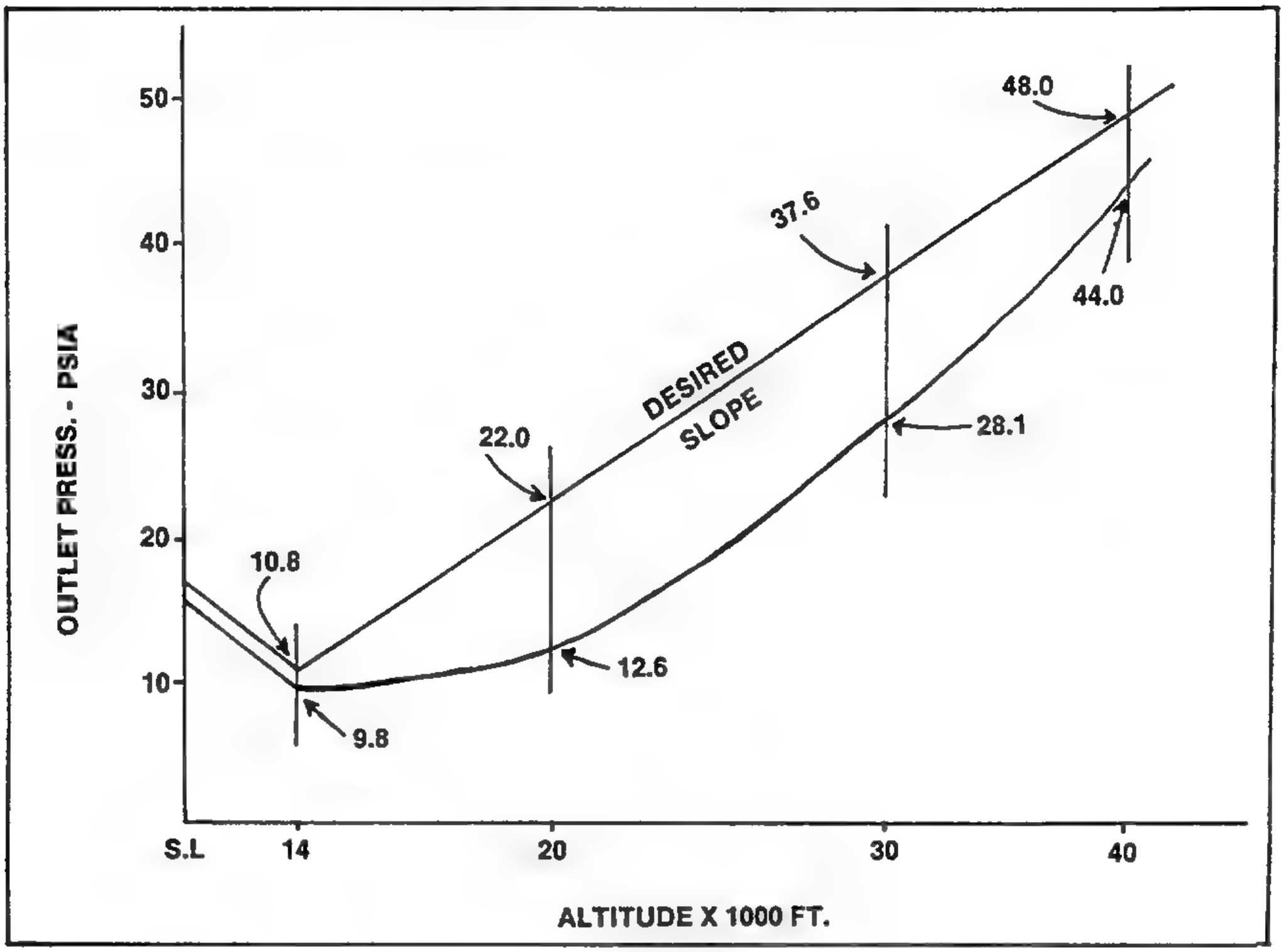
Z. Close valves (D) and (F) figure 703. Adjust valve (E) for 20,000 feet indication on altimeter (K).

AA. Adjust valve (F) for an indication of 25 LPM on flowmeter (G). Read pressure indication on gauge (MM) and record on graph paper prepared in accordance with figure 706.

AB. Close valve (F, figure 703) and adjust valve (E) for indication of 40,000 feet on altimeter (K). Adjust valve (F) for an indication of 25 LPM on flowmeter (G). Read pressure indication on gauge (MM) and record on graph. Close valve (E) and open valve (D) until altimeter (K) indicates ground level. Close valve (LL), open valves (C) and (F) fully to vent system. Close valve (F).

AC. Draw a line between the pressure indications recorded in step AA. and AB. This line shall be parallel with the desired slope.

NOTE: If the angle of the line drawn in greater than the angle of the desired slope, loosen screws (205, IPL figure 1) and adjust support (200) in the direction of aneroid assembly (220) and tighten screws (205). If the angle is less than the angle of the desired slope, adjust support away from aneroid assembly (220). Repeat steps W. through AC. until desired slope is achieved. After desired slope is achieved, apply Glyptal to base of support (200).



ALTITUDE X 1000 FEET
GRAPH
Figure 706

AD. Close valves (C) and (D) figure 703. Adjust valve (E) for 40,000 feet on altimeter (K). Open valve (LL) and adjust valve (F) for 25 LPM on flowmeter (G). Gauge (MM) shall indicate below 48.0 psia.

AE. Open valve (C) and adjust valve (F) for an indication of 1500 LPM on flowmeter (G). Gauge (MM) shall indicate above 44.0 psia.

AF. Close valve (E), open valve (D) until 20,000 feet is indicated on altimeter (K).

AG. Adjust valve (F) for an indication of 680 LPM on flowmeter (G). Gauge (MM) shall indicate above 12.6 psia. Close valve (E), open valve (D) and return to ground level.

AH. Reset spring (325, IPL figure 1) and vent all contained gas from system through valve (F, figure 703).

AJ. Close valves (F), (AA), (EE) and (OO). Open valve (BB). Adjust regulator (JJ) for an indication of 100 psi on gauge (H). Adjust regulator (X) to produce a 2000 psi indication on gauge (I), hold in this condition for two minutes. After two minutes, close valve (BB) and slowly open valve (F) until gauge (H) indicates zero.

AK. Close valves (F) and (LL). Reduce pressure indication on gauge (I) to 500 psi using regulator (X).

AL. Install test cover (12, figure 901) to unit under test and open valve (AA, figure 703).

AM. Close valve (D) and adjust valve (E) until control unit turns on automatically.

AN. Adjust valve (E) for an indication of 20,000 feet on altimeter (K).

AP. Slowly open valve (F) and vent system until gauge (H) stabilizes.

AR. Close valves (C), (F), and (LL).

AS. Open valves (EE) and (OO).

AT. Repeat steps W. through AC.

AU. Repeat step AC. as required. If any adjustment of setscrew (160, IPL figure 1) is required, repeat step AJ., then steps Z. through AG.

NOTE: Steps Z. through AG. must be repeated until unit functions properly after accomplishing step AJ.

AV. Reset spring (325) and vent all pressure from system using valve (F, figure 703) and regulator (X).

AW. Close all valves and switches, remove the unit from the test stand, remove all test plugs and fittings and complete assembly.

42. Apply Loctite, Grade C to setscrews (160) and Glyptal to nuts (175), (185) and (320) and bolt (315) to retain setting.

43. Screw detent assembly (265) into block (355) using wrench (1, Figure 901).

44. Place gaskets (60 and 140, IPL Figure 1) and cover subassembly (125 or -125A) onto body assembly (730) and secure with screws (130) and washers (135). Cover the heads of four corner screws (130) with torque paint.

45. Adjust detent assembly (265) until top is flush with cover subassembly (125).

46. Secure housing (45), previously assembled in step 7, to cover subassembly (125) and block (355) using screws (50) and washers (55). Cover the heads of two screws (50) with torque paint.

47. Place insert (475) and screw (470) in body assembly (730) to lock cap assembly (465) in place. Cover the head of screw (470) and cap (465) at body (730) with torque paint.

    NOTE: To facilitate testing, cover aneroid locking screw (335) port with plastic tape.

48. Test partially assembled control unit in accordance with procedures in TESTING, paragraph C.

49. Secure plate (145) to body assembly (730) with screws (150). Cover the heads of screws (150) with torque paint.

50. Thread union (435) and seal (440) into body assembly (730) and elbow (450), nut (455) and packing (460) previously assembled in step 16 into body assembly (730). Apply torque paint to union (435) and seal (440) at body (730).

51. Storage Instructions

    1. Cap inlet and outlet fittings with protective closures.

    2. Wrap the control unit to prevent dust or other foreign matter from entering. Do not use any preservative coating on the control unit.

FITS AND CLEARANCES

1. Table 801 presents the torque values necessary to assemble the unit.

UNIT	TORQUE lbf. in (N.m)
Retainer (500, IPL figure 1)	135 (15,26)
Screw (520)	10 (1,13)
Valve Assembly (535)	190 (21,47)
Stem (560)	5 (0,56)
Nut (670)	6 (0,68)

Assembly Torque Values
Table 801

SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT

1. All special tools and test equipment required to overhaul the control unit are listed in figure 901 and illustrated in figure 902.

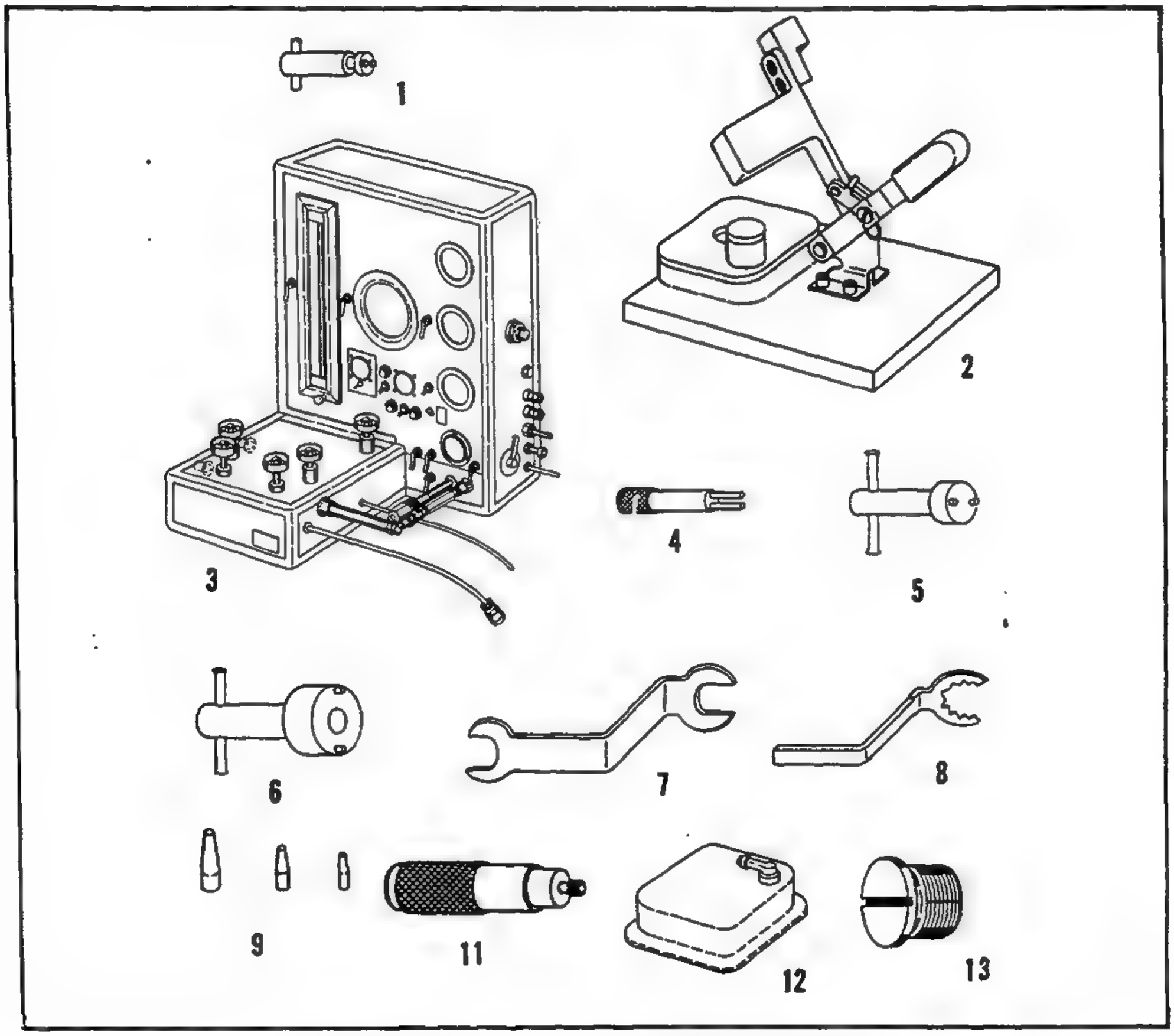
FIGURE 902 ITEM NO.	*PART NUMBER	PART NAME	APPLICATION
1	25316-T91-1	Wrench	Used to remove/ install detent assembly (265, IPL figure 1)
2	25682-T58-1	Leak Test Hold-ing Fixture	Used to leak test cover subassembly (125)
3	800801-00-T53-1	Test Stand	Used to test the control unit
4	800801-T91-1	Wrench	Used to remove/install valve assembly (665 through 685)
5	800801-T91-2	Wrench	Used to remove/install cap (570)
6	800801-T91-3	Wrench	Used to remove/install cap assembly (465) and cap (570), retainer (500)
7	800801-T91-4	Wrench	Used to remove/install aneroids (220)
8	800801-T91-6	Wrench	Used to remove/install nut (230)
9	22505-T52-1	Stylus	Used to remove/install packings (65, 90, 235, 370, 410, 420, 430, 460, 505, 565, 575, 640, 655 and 705)
10	-DELETED-		
11	10000728-T52-1	Alignment Tool	Used to align frame (345) with body assembly (730)

*Manufactured by Scott Aviation, Lancaster, N.Y.

Special Tools, Fixtures and Test Equipment List (Sheet 1 of 2)
Figure 901

FIGURE 902 ITEM NO.	*PART NUMBER	PART NAME	APPLICATION
12	25682-T58-2	Test Cover	Used during reassembly testing
13	25384-T58-1	Test Plug	Used during reassembly testing

Special Tools, Fixtures and Test Equipment List (Sheet 2 of 2)
Figure 901



Special Tools, Fixtures and Test Equipment
Figure 902

803661
COMPONENT MAINTENANCE MANUAL WITH IPL

ILLUSTRATED PARTS LIST

1. This illustrated Parts List covers the 803661-01, 803661-03 and 803661-04 Pneumatic Flow Control Units.

2. Group Assembly Parts List

   A. The Group Assembly Parts List consists of a parts listing and a completely indexed exploded view drawing. Each assembly listed is followed immediately by its component parts, properly indented thereunder, to show their relationship to the assembly.

   B. The quantities listed in the "UNITS PER ASSY" column are the total quantity used per control unit at the location indicated.

   C. The part numbers listed in the "PART NUMBER" column are Scott Aviation part numbers except standard parts, which are listed by "AN" and "MS" part number, and vendor parts, which are listed by vendor part numbers. The following list contains the code and name and address of the vendors suppling items for the control unit including Tables 401 and 701.

VENDOR'S CODE

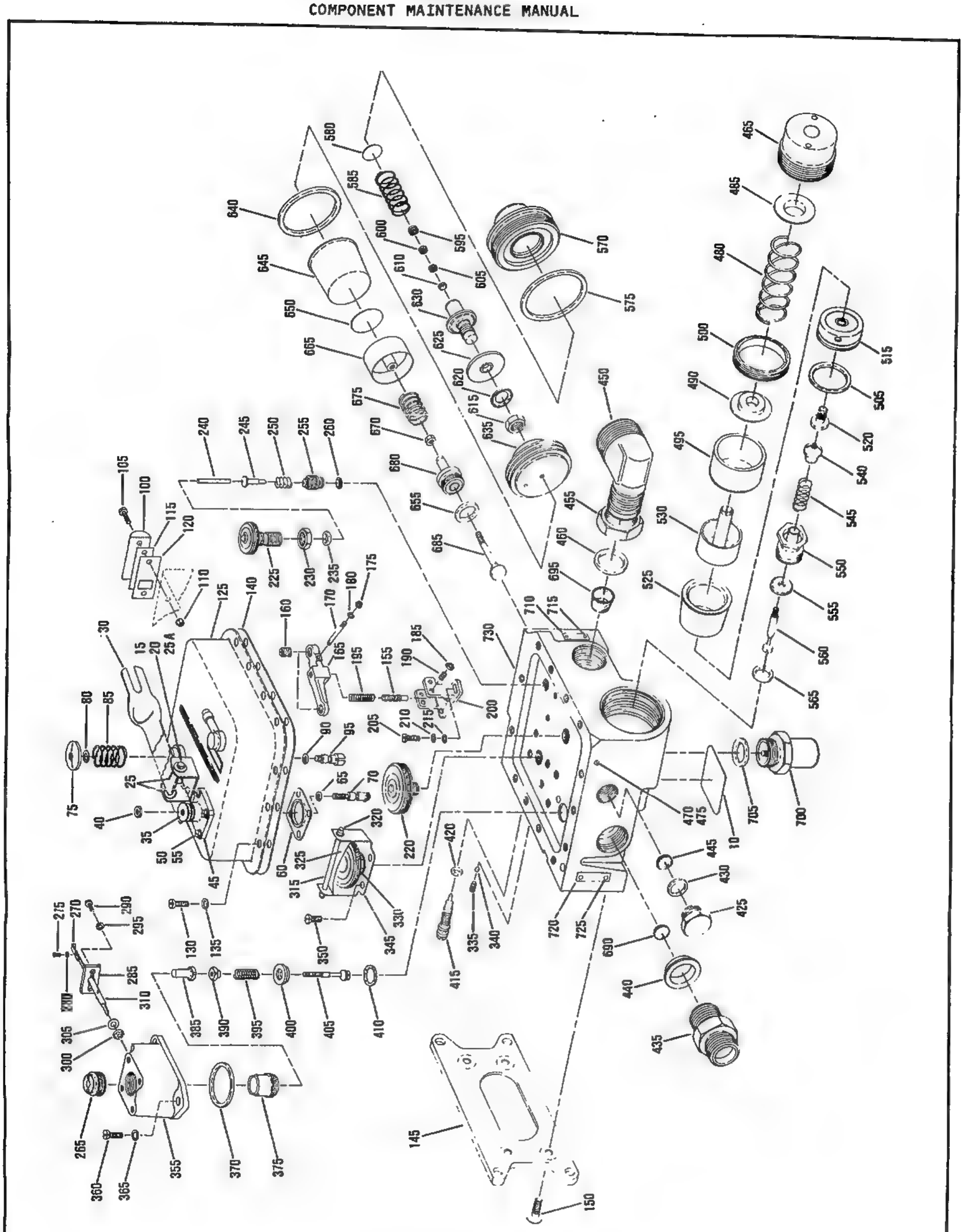
CODE	NAME AND ADDRESS
V02697	Parker Seal Co. Cleveland, Ohio
V05972	Loctite Corporation Newington, Connecticut
V07098	Linde Division of Union Carbide Tonawanda, New York
V08800	General Electric Co. Insulating Materials Dept. Schenectady, New York
V12179	Navan, Inc. El Segundo, California
V18034	Nupro, Inc. Willoughby, Ohio
V18632	Chemplast, Inc. Wayne, New Jersey

VENDOR'S CODE (Continued)

CODE	NAME AND ADDRESS
V18873	E.I. DuPont De Nemours and Co., Inc. Wilmington, Delaware
V82682	Tempil Division Big Three Industries Inc. S. Plainfield, New Jersey
V91427	B.F. Goodrich Chemical Co. Cleveland, Ohio
V91784	Hooker Chemical Corp. Niagara Falls, New York

3. How to use this illustrated Parts List

   A. If neither the part number nor the nomenclature is known, the part can be found by comparison with exploded view illustration. When located on the illustration, the index number will refer to the line in the Group Assembly Parts List with the part number and the nomenclature.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25A
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	FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY	
	1 -1	803661-01		CONTROL UNIT - PNEUMATIC	A	REF	
	-5	803661-04		CONTROL UNIT - PNEUMATIC	B	REF	
	-6	803661-03		CONTROL UNIT - PNEUMATIC	C	REF	R
	10	10007556		. PLATE - ID		1	
	15	MS20392-2C25		. PIN	AB	1	
				ATTACHING PARTS			
	20	MS24665-1012		. PIN - COTTER	AB	1	R
				---*---			
	25	AN960-10		. WASHER	AB	2	R
	25A	33451-009		. WASHER	AB	1	R
	30	25393-13		. LEVER ASSEMBLY	AB	1	
	35	25392		. SPOOL		1	
				ATTACHING PARTS			
	40	MS35649-244		. NUT		1	
				---*---			
	45	10001777		. HOUSING		1	
				ATTACHING PARTS			
	50	AN500D4-6		. SCREW		4	
	55	MS35338-40		. WASHER		4	
				---*---			
	60	25397		. GASKET		1	
	65	2-5COMP-S753-70 (GRN)		. PACKING -PREFORMED (V02697)		1	
	70	10001776		. PLUNGER		1	
	75	25387		. BUTTON		1	
	80	MS3533-70		. WASHER		1	
	85	25380		. SPRING - HELICAL - COMPRESSION		1	
	90	2-5COMP-S753-70 (GRN)		. PACKING -PREFORMED (V02697)		1	
	95	10000725		. PLUNGER		1	
	100	25307		. LENS		1	
				ATTACHING PARTS			
	105	AN500D2-5		. SCREW		2	
	110	H14-02		. NUT (V75237)		2	
				---*---			
	115	25383		. PLATE		1	
	120	25382		. GASKET		1	
	125	801194-01		. COVER SUBASSEMBLY	AB	1	
	-125A	801194-02		. COVER SUBASSEMBLY	C	1	R
				ATTACHING PARTS			
	130	MS33359-213		. SCREW		13	
	135	MS35333-70		. WASHER		13	
				---*---			

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY
1 140	24509		. GASKET - COVER		1
145	24686-01		. PLATE - MOUNTING		1
			ATTACHING PARTS		
150	59626-00		. SCREW		4
			---*---		
155	25477		. SETSCREW		1
160	10002610		. SETSCREW		2
165	10007548		. LEVER		1
			ATTACHING PARTS		
170	10001786		. PIN - LEVER		1
175	H14-02		. NUT (V75237)		2
180	AN960-3		. WASHER		2
185	MS35649-244		. NUT		2
190	10001801		. SETSCREW		2
			---*---		
195	25306		. SPRING - HELICAL -		1
			COMPRESSION		
200	10007549		. SUPPORT - LEVER		1
			ATTACHING PARTS		
205	MS33359-228		. SCREW		2
210	MS35333-71		. WASHER		2
215	MS15795-805		. WASHER		2
			---*---		
220	10001572		. ANEROID		1
225	10001571		. BELLOWS ASSEMBLY		1
230	AN316C5		. NUT		1
235	MS9068-902		. PACKING - PREFORMED		1
240	10001631		. PIN - PUSH		1
245	28846-1		. STEM		1
250	10001793		. SPRING - HELICAL -		1
			COMPRESSION		
255	800874-00		. SEAT ASSEMBLY		1
260	10001635		. GASKET		1
265	25384-1		. DETENT ASSEMBLY		1
270	25680		. INDICATOR		1
			ATTACHING PARTS		
275	AN520-0R3		. SCREW		1
280	MS27183-1		. WASHER		1
			---*---		
285	25394		. PLATE - PIVOT		1
			ATTACHING PARTS		
290	MS33359-213		. SCREW		2
295	MS35333-70		. WASHER		2
			---*---		

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY	
1 300	25736		. WASHER - SEAL		1	
305	25723		. WASHER - BACK UP		1	
310	25304-3		. LEVER ASSEMBLY		1	
315	3501-01		. BOLT - TIE		1	
			ATTACHING PARTS			
320	58526-00		. NUT - HEX		2	
			---*---			
325	10001645		. SPRING - LEAF		1	
330	10002609		. ANEROID		1	
			ATTACHING PARTS			
335	AN565AC4H4		. SETSCREW		1	
340	2837-2		. INSERT - NYLON		1	
			---*---			
345	10001656		. FRAME		1	
			ATTACHING PARTS			
350	MS33359-213		. SCREW		4	
			---*---			
355	10001657		. BLOCK - MOUNTING		1	
			ATTACHING PARTS			
360	AN500D4-5		. SCREW		3	
365	MS35333-70		. WASHER		3	
			---*---			
370	MS9068-020		. PACKING - PREFORMED		1	
375	10001643		. HOUSING - VALVE		1	
-380	803823-01		. VALVE ASSEMBLY -		1	R
			ACTUATION			
385	10001644		. . NUT - CAP		1	
390	25698		. . NUT - LOCK		1	
395	25481		. . SPRING - HELICAL -		1	
			COMPRESSION			
400	10007937		. . SEAT		1	R
405	10873		. . STEM		1	
410	MS9068-012		. PACKING - PREFORMED		1	
415	10001669		. SCREW - ADJUSTING		1	
420	MS9068-008		. PACKING PREFORMED		1	
425	25288		. PLUG - TEST		1	
430	MS9068-902		. PACKING - PREFORMED		1	
435	MS21902-5C		. UNION	AB	1	
440	VD261-0109-0105		. SEAL - BOSS (V12179)	AB	1	
445	8820-4		. FILTER		1	
450	10003401		. ELBOW	AB	1	
450A	25886-00		. FITTING - OUTLET	C	1	R
455	AN924-8D		. NUT	AB	1	
460	MS9068-908		. PACKING - PREFORMED		1	

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY
1 465	800855-00		. CAP ASSEMBLY		1
			ATTACHING PARTS		
470	AN565AC4H4		. SETSCREW		1
475	2837-2		. INSERT - NYLON		1
			---*---		
480	10001639		. SPRING - HELICAL -		1
			COMPRESSION		
485	10001722		. WASHER - THRUST		1
490	10001723		. WASHER - THRUST		1
495	10001626		. SLEEVE		1
500	10001627		. RETAINER - SLEEVE		1
505	MS9068-021		. PACKING - PREFORMED		1
-510	800856-00		. DIAPHRAGM ASSEMBLY		1
515	10001724		. . DAMPENER		1
			ATTACHING PARTS		
520	10001624		. . SCREW - HOLD DOWN		1
			---*---		
525	59317		. . BELLOFRAM		1
530	10001641		. . PISTON		1
-535	800850-00		. VALVE ASSEMBLY		1
540	10001629		. . HEAD - STEM		1
545	10001721		. . SPRING - HELICAL -		1
			COMPRESSION		
550	800849-00		. . GUIDE ASSEMBLY		1
555	10001623		. . SEAT - VALVE		1
560	10001633		. . STEM - VALVE		1
565	3-5COMP77-		. PACKING - PREFORMED		1
	545		(V02697)		
570	10001694		. CAP - SURGE VALVE		1
575	2-29COMP-		. PACKING - PREFORMED		1
	S604-7		(V02697)		
580	25882		. DISC - SLIP		1
585	25286		. SPRING - HELICAL -		1
			COMPRESSION		
-590	25530-2		. ORIFICE AND DIAPHRAGM		1
			ASSEMBLY		
595	55573		. . SETSCREW		1
600	8938-1		. . SCREEN - FILTER		1
605	20489		. . PACKING - GLASS WOOL		AR
610	8938-1		. . SCREEN - FILTER		1
615	25532		. . NUT - HEXAGON		1
620	25533		. . RING		1
625	25883		. . DIAPHRAGM		1
630	25531-1		. . ORIFICE ASSEMBLY		1
635	10001630		. SEAT		1
640	MS9068-028		. PACKING - PREFORMED		1

- ITEM NOT ILLUSTRATED

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY
1 645	59334		. BELLOFRAM		1
650	10001632		. PLATE - DISC		1
655	2-15COMP77-545		. PACKING - PREFORMED (V02697)		1
-660	800853-00		. VALVE ASSEMBLY - FLOW CONTROL		1
665	10001636		. . PISTON		1
670	MS35649-244		. . NUT		1
675	10001647		. . SPRING - HELICAL - COMPRESSION		1
680	800854-00		. . GUIDE AND SEAT ASSEMBLY		1
685	10001649		. . STEM		1
690	8820-3		. FILTER		1
695	25711		. SCREEN		1
700	800860-00		. VALVE ASSEMBLY - RELIEF		1
705	MS9068-908		. PACKING - PREFORMED		1
710	25297		. PLATE - OUTLET		1
			ATTACHING PARTS		
715	MS21318-1		. SCREW - DRIVE		2
			---*---		
720	25297-1		. PLATE - INLET		1
			ATTACHING PARTS		
725	MS21318-1		. SCREW - DRIVE		2
			---*---		
730	800885-00		. BODY ASSEMBLY		1

- ITEM NOT ILLUSTRATED